EXHIBIT 10

Volume I Pages 1-293

Exhibits 1-32

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF NEW JERSEY

_____

IN RE JOHNSON & JOHNSON TALCUM POWDER PRODUCTS MARKETING, SALES PRACTICES, AND PRODUCTS LIABILITY LITIGATION

MDL NO. 16-2738(MAS)(RLS)

_____

VIDEOCONFERENCE DEPOSITION OF

SONAL SINGH, M.D., M.P.H

Thursday, April 4, 2024, 9:03 a.m.

BEECHWOOD HOTEL

363 Plantation Street

Worcester, Massachusetts 01605

-----REPORTER: Sonya Lopes, RPR, CSR-----

APPEARANCES:

Ashcraft & Gerel, LLP
Michelle A. Parfitt, Esq.
1825 K Street, N.W., Suite 700
Washington, D.C. 20006
202.783.6400
mparfitt@ashcraftlaw.com
for Plaintiffs

Levin Papantonio Rafferty
Christopher V. Tisi, Esq.
316 South Baylen Street
Pensacola, Florida 35202
850.435.7000
ctisi@levinlaw.com
for plaintiffs

Skadden, Arps, Slate, Meagher & Flom LLP
Zachary W. Martin, Esq.
500 Boylston Street
Boston, Massachusetts 02116
617.573.4862
zachary.martin@skadden.com
for Defendants

APPEARANCES:

Also present: Luis Chu (via Zoom)
Patrick Lyons (via Zoom)
Tracy Finken (via Zoom)

I N D E X

WITNESS: SONAL SINGH, M.D., M.P.H

EXAMINATION BY: PAGE
Mr. Martin 8
Ms. Parfitt 275

EXHIBIT PAGE
Exhibit 1, deposition notice.....9
Exhibit 2, invoice.....14
Exhibit 3, curriculum vitae.....18
Exhibit 4, list of testimony.....31
Exhibit 5, supplemental expert report of Sonal Singh, M.D., M.P.H.....34
Exhibit 6, ACOG printout.....37
Exhibit 7, National Cancer Institute PDQ printout.....41
Exhibit 8, January 16, 2019 transcript of Sonal Singh, M.D., M.P.H.....42
Exhibit 9, American Cancer Society printout.....47
Exhibit 10, order from Court in Viagra case.....52

I N D E X

EXHIBIT PAGE
Exhibit 11, February 2, 2023 transcript of Sonal Singh, M.D., M.P.H...57
Exhibit 12, 2021 article by Nicolas Wentzensen, et al.....86
Exhibit 13, 2023 article by Katie M. O'Brien, et al.....104
Exhibit 14, 2019 article by Iwona M. Gabriel, et al.....117
Exhibit 15, 2016 article by Daniel W. Cramer, et al.....127
Exhibit 16, 2024 article by Julie E. Goodman, et al.....133
Exhibit 17, 2020 article by Katie M. O'Brien, et al.....138
Exhibit 18, 2018 report of Sonal Singh, M.D., M.P.H.....154
Exhibit 19, 2020 Dana R. Gossett, M.D. editorial.....170
Exhibit 20, 2016 study by Steven A. Narod.....179
Exhibit 21, 2018 article by Wera Berge, et al.....187

I N D E X

EXHIBIT PAGE
Exhibit 22, 2019 article by Mohamed Kadry Taher, et al.....191
Exhibit 23, 2021 article by Colette P. Davis, et al.....207
Exhibit 24, 2021 article by Kiarash Tanha, et al.....219
Exhibit 25, April 2021 Health Canada document.....227
Exhibit 26, 2022 article by Sean A. Woolen, et al.....230
Exhibit 27, supplementary table.....230
Exhibit 28, 2008 article by Anna H. Wu, et al.....248
Exhibit 29, 2019 article by Amy K. Harper, et al.....269
Exhibit 30, "EPA Asbestos Part 1; chrysotile asbestos; regulation of certain conditions of use under the Toxic Substance Control Act, TSCA," document.....276

I N D E X

EXHIBIT PAGE
Exhibit 31, article by Kemi Ogunsina, M.D., et al.....283
Exhibit 32, article by Katie M. O'Brien, et al.....285

*Exhibits returned to Mr. Martin

SONAL SINGH, M.D., M.P.H,
was duly sworn by the notary public,
examined, and testified as follows:

EXAMINATION

BY MR. MARTIN:

Q. Good morning, Dr.Singh. My name is Zachary Martin. I'm here on behalf of Johnson & Johnson and LLC management. You understand you're here to discuss your opinions in your supplemental expert report in the In re Johnson & Johnson talcum powder MDL?

A. That is correct.

Q. And you're also offering the same opinions in the New Jersey multicounty litigation; is that correct?

A. Yes. That is correct.

Q. Okay. So I know you've been deposed before, including in this case. So I will not belabor the rules. But just please give verbal answers -- like, not a shake of the head or nod of the head -- to make it easy for your court reporter here.

Let me finish questions. I'll do my best to let you finish your answers. You may want to take a beat in case Ms. Parfitt wants to object. If

she does object, please still answer the question anyway, unless she instructs you not to.

And if you want to take a break at any time, just let me know. Just try not to take a break while a question's pending. If you can answer the question, then we'll take a break.

(Deposition notice, Exhibit 1, marked)

Q. Doctor, have you seen this document before?

A. That is correct.

Q. Okay. And have you seen exhibit -- Schedule A -- I'm sorry -- to the document, just on the next page?

A. That is correct.

Q. Okay. And that schedule requests that you produce certain documents. To the best of your knowledge, are all the -- were all the documents in Schedule A produced to us in advance of this deposition?

A. That is correct.

Q. Okay.

MS. PARFITT: Zack, if I may, we also filed objections to the notice of deposition and requested documents. So I'm not sure whether you're going to mark that as part of the file, but for the record.

Page 10

MR. MARTIN: I am aware of the objections.
MS. PARFITT: Thank you.
MR. MARTIN: I'm not going to mark that as part of the file, but I'm aware of those.
Q. But to the extent not barred by the objections of counsel, you've produced everything requested?
A. That is correct.
Q. Okay. Did you bring any additional materials with you today?
A. Those are references -- those are all in my -- but, you know, I've scribbled on them. That's what it is.
Q. But there's no documents in there -- there's nothing in there that is not either in your reference list or in the Dropbox that Ms. Parfitt produced on Monday?
A. No, as far as I know.
Q. How did you prepare for the deposition today?
A. I read my report, and I reviewed my report. I read my previous report. And where I had questions for myself, I went through those references and I, you know -- then yesterday

Page 11

evening, I met with the counsel for two, three hours to discuss, prepare.
Q. And when you say "counsel," is that the two counsel here in the room?
A. That is correct.
Q. And did you do that in person or over the phone?
A. In person.
Q. Okay. Did they give you any additional materials at that meeting?
A. I don't recall.
Q. Okay. You said you reviewed your two reports in this case. Did you review your prior deposition?
A. I did not.
Q. Okay. Have you at any point reviewed any of the depositions given by other experts in this litigation?
A. I have.
Q. Okay. Which experts?
A. I think at the time of the initial deposition, I reviewed Dr. Diette.
Q. Diette, I believe, yeah.
A. Diette. Yeah. Sorry. His. And then for this deposition, I was provided Dr. Moorman. And

Page 12

Dr. Cote, I was provided that. I skimmed through it, you know, to the extent I reviewed -- yes -- and have it.
Q. I know you said you hadn't looked at your previous deposition in advance of today. Have you looked at that deposition since you gave it in January 2019?
A. No.
Q. Okay. To the extent you remember what you said in that deposition, is there anything you would change or that you don't stand by?
MS. PARFITT: Objection. Form.
A. I think you'd have to, you know, point what specifics you're asking for. But in terms of the causal opinion, it is reflected in my expert report -- supplemental report.
Q. Okay. We will -- we might look at specific parts --
A. Sure.
Q. -- later this morning. Beyond your two expert reports, are there any writings in which you set out opinions related to the purported relationship between talcum powder and ovarian cancer?
A. No.

Page 13

Q. In 2018 and '19, you were charging $600 an hour. Is that still how much you charge?
A. A little bit more. 650.
Q. 650. Okay.
A. Inflation.
Q. Understood. Understood. And beyond your hourly rate, are there any other charges that you have charged plaintiffs' counsel?
A. No.
Q. No retainer?
A. No.
Q. Okay. Have you traveled at all for this litigation?
A. Yesterday I had to travel because of the weather. So that wasn't preplanned. I stayed in the hotel so that I could make it in time for you. That's all.
Q. Okay.
A. I live a little bit out of town.
Q. Never traveled outside of Massachusetts for --
A. No. No.
Q. -- for the case. Okay. I have Exhibit 2 here. This is something that was produced to us on Monday by Ms. Parfitt.

Page 14

(Invoice, Exhibit 2, marked)
Q. Does this invoice reflect all of the work that you have done on this case since your last deposition in January of 2024 (verbatim)?
MR. TISI: I'm sorry. I didn't realize --
MR. MARTIN: I'm sorry. This is two-sided, for anyone who hasn't seen that.
A. Yeah. This reflects the invoice I submitted at that time. I haven't submitted any other invoices.
Q. That wasn't quite my question. Does that reflect all the work you've done --
A. No.
Q. -- since -- okay. Does it reflect all the work you had done from January of 2019 through the date of this invoice?
A. Yeah.
Q. Okay. So you didn't do any work after your deposition and before September of last year?
A. No.
Q. Okay. Can you estimate approximately how many hours you've spent on this case since the date of this invoice, which is November 15th of 2023?

Page 15

A. I would say 40, 45 hours. I don't have an exact number.
Q. That's fine. That's ballpark. So if I were -- if I could do mental math, I probably wouldn't be a lawyer. But that reflects approximately -- 650 times 45 -- $29,000 worth of work since then. Does that seem right? Okay. So plus approximately 42, $43,000, that brings the grand total to somewhere in the neighborhood of $70,000 of work since your past deposition.
A. That is correct.
Q. Okay. Have you done work related to talc litigation outside of the MDL?
A. No.
Q. Okay. So what we just talked about in this invoice reflects the entirety of your work on any litigation related to talc since your last deposition.
A. That is correct.
Q. Okay. What about litigation generally? Can you estimate how much you've received in money -- how much money you've received for litigation work since your last deposition in 2019?
MS. PARFITT: Objection.

Page 16

A. I cannot. I mean, it's -- what -- 2018, 2019? Yeah.
Q. Your last deposition was January of 2019.
A. I cannot estimate.
Q. Okay. Not even a ballpark number?
MS. PARFITT: Objection. Form.
A. No, not really.
Q. Do you know if it was more or less than a hundred thousand dollars?
MS. PARFITT: Objection. Form.
A. Probably more.
Q. Do you know if it's more or less than $200,000?
MS. PARFITT: Objection. Form.
A. I don't know that.
Q. Approximately what percentage of your income last year came from litigation work?
MS. PARFITT: Objection. Form.
A. Last year?
Q. The year 2023.
MS. PARFITT: Same objection.
A. I can't recall the specifics of it.
Q. Okay. Again, more or less than 30 percent?
MS. PARFITT: Objection. Form.
A. You know, I have other sources of income.

Page 17

You know, I do trading. I do other work. So I don't keep track of -- I mean, I produced the invoices that you asked for.
Q. What is your salary from the University of Massachusetts?
MS. PARFITT: Objection. Form. What's the relevance? Relevancy. That has no relevancy.
MR. MARTIN: It's relevant to credibility to get approximately what percentage of his income comes from litigation.
MS. PARFITT: I object. You can ask the question with regard to the percentage of his income, if he knows that. I object to asking him what his salary is from the university. I instruct you not to answer that.
MR. MARTIN: He didn't answer the question about percentage, which is why I was trying to get at it from a different angle. If you're instructing him not to answer, he can not --
MS. PARFITT: I instruct him not to answer.
Q. Do you have an estimation of your non-litigation income last year?
MS. PARFITT: Objection. Form. It's the same question. Non-litigation income would

Page 18

include salary.
A. I didn't prepare for sort of, you know, monetary, which income from where. I produced what was here, and that's what I was prepared to answer.
MR. MARTIN: I think it's relevant to credibility, but we'll move on.
MS. PARFITT: Thank you.
MR. MARTIN: Let's look at your CV.
(Curriculum vitae, Exhibit 3, marked)
Q. So this is the CV that was produced to us on Monday. And I believe it's current as of this month. Is there anything that looks not current to you in that?
A. No.
Q. Okay. So there are a couple of changes since the time of your last deposition that I want to talk about. The first is on page 1. And it's your role as associate professor in the division of health systems sciences. Okay. You started that role in October of 2022?
A. Yeah. It was more, you know -- we were at Meyers. And it was more an incorporation than an institute into the school of medicine.
Q. Okay. So just so I'm clear, it was more the creation of a formal division of health systems

Page 19

sciences?
A. Exactly. Yes. It's very new. It's, you know.
Q. It incorporates work you'd previously been doing at the university?
A. Yeah.
Q. Okay. Does it incorporate work from the Department of Family Medicine & Community Health, the Department of Quantitative Health Sciences, or both?
A. So, you know, the way it was, we -- there was Meyers Health Institute maybe at that time that I was deposed. And the institute -- medical school brought in people who do health systems research into one institute. And that's why it's reflected there.
Q. Actually, it's on the same page.
A. Sure.
Q. I'm sorry. No. It's not. It's on page 3, teaching and classroom activities. It looks like you started to teach a course at the medical school since your last deposition.
A. That is correct.
Q. And is "Clinical epidemiology for medical students" the name of that course?

Page 20

A. Yes.
Q. Okay. What did that course entail, generally?
A. It entails starting out with first years, usually teaching them about study designs, how to review a case control study, cohort study, randomized trials, and, you know, bias, confounding. So it's -- yeah.
Q. Just to be clear, when you say first-year students, you mean first-year medical students, not first-year residents.
A. No. These are medical students. They could be nursing students as well.
Q. Okay. Approximately how many students were in that class?
A. I don't recall. You know, usually -- sometimes it's 15.
Q. And is there a reason that you stopped teaching the class in 2022?
A. Yeah, there is. Because the class coincided with my clinical days so that it was sort of -- I had to choose between teaching.
Q. The class is still existing. It's just taught by someone else?
A. It is.

Page 21

Q. Can you guys flip to page 7, please?
MR. TISI: Can I just say I'm getting a note that your voice is really muffled.
MR. MARTIN: Off the record.
(A break was taken)
MR. MARTIN: Back on the record. So while we were off the record, Ms. Finken asked that Ms. Parfitt's objections be for all plaintiffs' counsel. So just memorializing that now that we're on the record.
Q. We were on page 7 of your CV, and at the top of page 7 it asks for submitted grants. First of all, can you explain what you mean by "submitted grants"?
A. Sure. So grants submitted are those that are being reviewed at the NIH, so these were submitted for NIH consideration. You see at the top "National Institute of Aging." So these have not been funded yet. They will be reviewed probably in April sometime. Then we'll know. So a department likes to know, you know "Are you working? Are you submitting new grants?"
Q. Fair to say, these aren't things -- well, beyond submitting the funding proposal, these aren't things on which you're doing active research.

Page 22

A. Yeah. No. No. The ones that are active are listed right below that.
Q. We'll get to those. So is this submitted grant related to talc at all?
A. No.
Q. Is it related to ovarian cancer at all?
A. No.
Q. Okay. As you mentioned, below the submitted grant, there are three active grants, all of which postdate your last deposition. Are any of those related to talc --
A. No.
Q. -- to ovarian cancer or cancer more generally?
A. No.
Q. All right. And then on "completed grants and contracts," going from page 7 and into page 8, I believe there are three or four that postdate your last deposition. I think three that started after your last deposition, those would be the three that are on page 7 or begin on page 7. Do you see that?
A. Yes.
Q. And do any of those grants have to do with talc?
A. No.

Page 23

Q. Okay. Cancer?
A. No.
Q. Okay. Let's turn to page 10. Since your last deposition in 2016 (verbatim), it looks like you've joined the editorial board of two journals: Frontiers in Drug Safety and Frontiers in Primary Care and Family Medicine. Is that correct?
A. That is correct.
Q. And you've left the editorial board of Evidence-Based Medicine?
A. That is correct.
Q. Okay. Since you joined the editorial board of Frontiers in Drug Safety, are you aware of whether they've published any articles related to talc?
A. I'm not aware of a specific journal, but I'm aware that Frontiers had a publication on that. I'm not sure if it's on drug safety, but the group of journals has it.
Q. Can you explain that a little bit more? Frontiers is a group of journals of which there are several topical journals. Is that more or less correct?
A. Yes. Yes.
Q. You're not aware of whether the two topical

Page 24

journals for which you were an editor published anything on talcum powder?
A. Yeah. Yeah.
Q. Okay. Do you know if the two -- if either of the journals for which you're an editor have published anything on asbestos since you joined?
A. No. I don't keep track of all the articles in the journal. I'm on the editorial board. So I get asked to review certain articles every year, at least six. That's sort of the mandate, so.
Q. So just so I understand the process, your job is essentially when someone submits an article for publication, you're one of the peer reviewers for the journal?
A. No. I'm the handling editor. So I get to ask, you know, if it's, you know -- the editor-in-chief looks at the editorial board and -- so I'm not the editor-in-chief. I'm an editorial board member. And they send it to me, say "Okay. You are the handling editor." And you send it out for review, comes back. And I may be asked to review, too, so there's two sort of aspects of the job.
Q. That's helpful. Thank you. Assume you haven't personally seen any articles --
A. No.

Page 25

Q. -- related to talc or asbestos. Okay. I want to look at your publications since 2019. Do you recall approximately how many things you've published since 2019?
A. Not really.
Q. Okay. So I went through your CV. Let's turn to page 26 first. Is it correct there have been no books or monographs since 2019?
MS. PARFITT: Objection. Form.
Q. Have you published any books or monographs since 2019?
A. No.
Q. Okay. Turning to page 28. First of all, can you explain what the difference between a peer-reviewed educational publication and a what we might call traditional peer-reviewed publication is?
A. Yeah. So for us, you know, in the academic world, we try to make a distinguish (verbatim) between, you know, research articles that are based on original data, so that, you'll see that in the original research section.
Others are editorials. We'll try to place into the editorial section. And then educational articles are if -- say I'm the expert, you know, I have an article on, say, COVID drugs and kidney

Page 26

disease. Then, you know, it might be -- so there's some distinction. It might be in the editorial section.

It might be -- I think it's also -- original research carries -- at least for academic promotion, it carries more weight. It's not that educational publications are not important, but they are distinct.

Q. So as I'm sure you can predict, we're going to talk a lot about meta-analyses and pooled analyses later today. Those you consider original research, even though they're not collecting the data originally.

A. Yes.

Q. Okay. So back to your CV. Have you published any educational publications since 2019?

A. I'd have to go back and look at it. Don't recall.

Q. If I said there were none listed there, would you believe me?

MS. PARFITT: Objection. Form. If you need to look, Doctor.

A. That is correct.

Q. Okay. Next page, page 29, peer-reviewed case reports. First of all, again, can you explain

Page 27

to me the difference between a case report and what we might call a traditional peer-reviewed publication?

A. Yeah. I mean, again, this is, you know -- these distinctions are more in our realm. In academic world, you want to make a distinction on the different type of scientific output that is coming out of, you know, lab or a person's record.

You know, in terms of distinction, case report is usually just one report that talks about, say, something that's really important or novel that gets across a point. So that's why it's in a distinct section.

Q. It usually deals with one case?

A. Yeah. Usually. Sometimes case reports are combined with case reports and reviews of the literature. So, you know, they could be in a different section.

Q. Are the results from case reports generally considered less reliable than the results from what we might call multicase literature?

MS. PARFITT: Objection. Form.

A. You know, that goes to the question at hand. Sometimes, you know, if the question is -- outcome is rare, usually, sometimes -- if you can

Page 28

look at some of my reports, some of them -- for example, we describe the report of Wernicke -- W-e-r-n-i-c-k-e -- encephalopathy. Yeah. Case reports can be informative in the -- but, obviously, if it's a common disease, then they're not as informative as other study designs.

Q. Would you agree with me that, holding the disease at issue constant, a case report is less informative than other study designs?

MS. PARFITT: Objection. Form. Misstates the testimony.

A. I want to understand the question.

Q. Sure. Holding the disease at -- you mentioned rare diseases versus common diseases. If it's the same disease, is a case report less informative than another type of literature?

MS. PARFITT: Objection. Form.

A. Yeah. If you had a more comprehensive study design.

Q. Let's look at correspondence on the next page. Do you see any correspondence there since 2019?

A. No.

Q. Okay. Can we flip back to 16? So these are peer-reviewed original research publications.

Page 29

And I count 33 since your last deposition.

A. Yeah. I don't remember the exact time, but yes.

MS. PARFITT: Why don't you take a look at your CV, Doctor.

A. I'm going with 33. December '19, so.

Q. Do any of the publications listed since January of 2019 address talc?

A. No.

Q. Okay. What about asbestos?

A. No.

Q. What about ovarian cancer?

A. No.

Q. Have you conducted any studies outside of litigation related to ovarian cancer since 2019 that are not listed here as publications?

A. No.

Q. Okay. Do you have any forthcoming publications related to ovarian cancer?

A. No.

Q. Okay. Are you working on any non-litigation research related to ovarian cancer currently?

A. No.

Q. Okay. Have you submitted the substance of

Page 30

your opinions in this case for peer review?
A. No.
Q. Okay. Outside of the statements you've given in litigation, have you given any public statements concerning talc and ovarian cancer since 2019?
MS. PARFITT: Objection. Form.
A. I've not spoken in the public, no.
Q. Any statements about asbestos?
A. No.
Q. Okay. Let's look at page 13. These are presentations you've given?
A. Yeah. This is a team. I mean, I have been on some. Others, I've presented. I'm not necessarily the first presenter.
Q. Understood. Fair to say, based on your answer to the last question, that none of the presentations since 2019 relate to talc or ovarian cancer?
A. No.
Q. Okay. Any forthcoming presentations related to talc or ovarian cancer?
A. No.
MR. MARTIN: Okay. Let's move to Exhibit 4.

Page 31

(List of testimony, Exhibit 4, marked)
Q. This is Exhibit B to your expert report. Is this exhibit a complete list of the testimony you've given in the last four years?
A. That's as much as I can recall.
Q. Okay. Do you think you would give testimony at a deposition and not remember the case?
A. I mean, after you received my -- I mean, after I received this, I tried to list as much as I can recall. And I did go back and look at --
Q. Okay.
A. It's not like I'm trying to hide anything.
Q. What was the nature of your opinions in Coates versus United States?
A. I don't recall the specifics of the opinion. I'd have to -- I didn't review.
Q. Do you recall the -- do you recall the general issue in the case?
A. Let me just look at it.
Q. Okay.
A. I think it related to prostate cancer -- I don't remember. Again, I don't want to guess.
Q. Okay. Do you remember how much you were paid for your testimony in that case?
MS. PARFITT: Objection. Form.

Page 32

A. I don't.
Q. Do you remember if it was more or less than $30,000?
MS. PARFITT: Objection. Form.
A. I don't recall.
Q. What about In re Tasigna Products Liability Litigation?
A. Yeah. This was a recent litigation. That, I recall. And I provided expert report and deposition that was admitted under Daubert recently. I recall that. Yeah.
Q. And what was the nature of your opinion in that case?
A. Yeah. That Tasigna is causally related to the development of atherosclerosis and peripheral artery disease.
Q. What does the drug Tasigna do?
A. It is an anticancer drug.
Q. Okay.
A. CML for -- chronic myeloid leukemia.
Q. Do you remember approximately how much you were paid in that case?
MS. PARFITT: Objection. Form.
A. I don't recall.
Q. Okay.

Page 33

A. But it was more than 30,000.
Q. Okay. There you go.
A. I can tell you.
Q. Thank you. More than a hundred thousand?
MS. PARFITT: Objection. Form.
A. I don't recall.
Q. Okay. Foutch versus Wilks and OU Medical Center?
A. Yes. I recall. This was a recent testimony.
Q. Okay. And do you recall how much you received for that?
A. I don't recall that.
Q. Again, more or less than $30,000?
MS. PARFITT: Objection. Form.
A. I cannot tell you that.
Q. Okay. Have you served as an expert but not testified in any cases in the last four years other than those three listed here?
MS. PARFITT: Objection to the extent -- he can answer a yes or no to that. But not any inquiry as to the lawyers or the litigation --
A. Yes.
MS. PARFITT: -- where he's not been declared an expert.

Page 34

Q. You have?
A. Yes.
Q. Okay.
A. I have. You know, I get inquiries about --
Q. Have you submitted an expert report in any of those cases?
A. I don't recall. I mean, this is my listing of deposition, as far as I can recall.
Q. Right. But, I mean, you'd agree with me that there are cases in which you may submit an expert report. It may settle. You may never be deposed.
A. I don't recall that. May have. Yeah.
Q. Okay.
MR. MARTIN: Can we mark this as Exhibit 5?
(Supplemental expert report of Sonal Singh, M.D., M.P.H, Exhibit 5, marked)
Q. If you can keep this towards the front of your pile. We'll probably be referring back to this several times. And this is your expert report in this case -- your supplemental expert report in this case.
So let's look at the first sentence. "I have been asked to supplement my previous expert

Page 35

report submitted on November 16, 2018 on whether the genital use of talcum powder products -- i.e., Johnson's Baby Powder and Shower to Shower -- are causally related to an increased risk of ovarian cancer." Are you offering an opinion related to any non-ovarian types of cancer?
A. No.
Q. Okay. So not mesothelioma?
A. No.
Q. Not uterine cancer?
A. No.
Q. Okay. Are you offering an opinion related to all ovarian cancers?
A. Epithelial.
Q. Epithelial ovarian cancer. Okay. Thank you.
Does the histological subtype of epithelial ovarian cancer matter?
MS. PARFITT: Objection. Form.
A. My work and opinions in this case are focused on epithelial ovarian cancer. To the extent that histologic types, you know, are included within that, it does matter.
Q. So your opinion would be that talc causes, for instance, clear-cell cancer.

Page 36

MS. PARFITT: Objection. Misstates his testimony.
A. My opinion would be that talc causes epithelial ovarian cancer. And your interpretation could be that, since, you know, clear-cell is epithelial ovarian cancer, then it increases that. But my testimony is that talc causes epithelial.
Q. So your testimony is not broken down by histological subtype of cancer.
A. That is correct.
Q. Okay. And, again, just to be clear, it's related to both invasive and borderline cancer.
A. Yes. You know, all epithelial cancers.
Q. Have you done any outreach to any public health organizations related to talc use and ovarian cancer?
MS. PARFITT: Objection. Form.
A. No, I have not.
Q. Let's talk about the American College of Gynecology. Would you agree it's generally a reputable organization?
MS. PARFITT: Objection. Form.
A. That is correct.
Q. Okay. Have you looked at any statements made by the American College of Gynecology since

Page 37

your last deposition?
A. I don't recall.
Q. Okay. Are you aware that they have updated their Website's "frequently asked questions" on ovarian cancer since your last deposition?
MS. PARFITT: Objection. Just testified he had not looked at it.
A. Yeah. I don't recall. I mean, if you show me, I can --
Q. Okay. Well, we can do that.
MR. MARTIN: This will be Exhibit 6.
(ACOG printout, Exhibit 6, marked)
Q. Can we turn to -- they're not paginated -- but the second page of this document.
A. Sure.
Q. Actually, I apologize. Let's turn back to -- let's start with page -- let's start with the final page of substantive text.
Do you see that it's -- it says last reviewed November 2021 and last updated May 2022?
A. That is correct.
Q. Okay. Now we can turn to the second page. Can you review the section "What are the risk factors for ovarian cancer?"
A. Sure.

Page 38

Q. I'll give you a minute.
MS. PARFITT: Thank you.
A. Yes.
Q. Okay. Thank you. Agree with me that talcum powder use -- genital talcum powder use is not listed there?
A. That is correct.
Q. Do you disagree with ACOG's decision not to list genital talcum powder use as a risk factor for ovarian cancer?
A. Yes.
Q. You do. Okay. Have you told anyone at the organization that?
A. No.
Q. Okay.
A. I don't -- I'm not an OB-GYN person.
Q. Understood. Let's flip a few pages forward to "reducing risk." Do you see that section?
A. Yes.
Q. Okay. And can you just take a second to review that section?
A. Yes.
Q. Okay. Thank you. Agree that there are some lifestyle recommendations there, such as using hormonal birth control pills?

Page 39

A. Yes.
Q. Okay. But, again, agree there's no recommendation to stop using talcum powder?
A. Yes. But there's no recommendation to lose weight as well. So it's not a full, comprehensive list of recommendations. Similarly, the risk factors don't capture all the risk factors, such as height (verbatim). And so, you know, there's other things -- smoking, we don't have it in the -- so it's not a comprehensive list. Obviously does not include talc but also does not include other things.
Q. Do you think this section should be more comprehensive?
A. Exactly.
Q. Okay.
MS. PARFITT: "This section" meaning the risk factors and --
MR. MARTIN: I apologize.
Q. Do you think this Website should be more comprehensive?
A. I agree.
Q. Okay. At your last deposition, I believe you said that you counsel your female patients to avoid genital talcum powder use. Do you recall that testimony?

Page 40

A. I don't recall. But if I said that, you know, we can look at it, and --
Q. We don't need to look at it. Do you currently counsel your female patients to avoid genital talcum powder use?
A. I think, you know, if -- particularly as it relates to ovarian cancer, yes.
Q. Yes. Do you do that only if they ask, or is that something you affirmatively say to them?
MS. PARFITT: Objection. Form.
A. I mean, you know, there's so much going on at a clinic visit that, you know, I'm not asking everyone about -- but when, you know, the decision goes about modifiable risk factors, I do ask.
Q. Is it fair to say it's not one of your highest priorities in an ordinary patient visit?
MS. PARFITT: Objection. Form.
A. So it's, you know, you -- for example, I'll use example of lung cancer. You know, you see a patient or -- who is at risk. You're talking about smoking. It's modifiable. You know, the risks for family histories are higher. But then that's not modifiable. You start thinking about weight reduction, things that are modifiable.
Q. Do you believe that the risk of ovarian

Page 41

cancer associated with talc use is comparable to the risk of lung cancer associated with smoking?
MS. PARFITT: Objection.
A. No. I was just using that as an example to explain how one discusses modifiable risk factors.
Q. I understand. It wasn't meant to be a gotcha question. It was just a question.
MR. MARTIN: Can we have this marked as well? Luis, this is not Tab 7. This is Tab 8, just if you're following along. This is the PDQ. I'm sorry, Luis. It's actually Tab 9.
MR. CHU: Okay. Got it. Thanks.
MR. MARTIN: But it's Exhibit 7 here at the deposition.
(National Cancer Institute PDQ printout, Exhibit 7, marked)
THE WITNESS: Can we take a break after this question?
MR. MARTIN: Sure. If you'd like, we can take a break now.
THE WITNESS: Yeah.
MR. MARTIN: Let's go off the record.
(A break was taken)
MR. MARTIN: Back on the record.
Q. Do you remember talking about the National

Page 42

Cancer Institute PDQ at your previous deposition?
A. I don't recall, but I have seen this document that you presented.
Q. Okay. Let's look at -- let's actually look at your deposition, which I can mark as whatever the next exhibit is.
(January 16, 2019 transcript of Sonal Singh, M.D., M.P.H, Exhibit 8, marked)
Q. Can we look at the beginning of page 94 of your deposition, traditional page 94, which is page 25 of the mini document?
MS. PARFITT: He's talking about the actual page number.
A. Yeah.
Q. Begins "All right. This document." "This document that we're looking at from the National Cancer Institute, Exhibit 15, was updated in January of 2019." And your answer is "Yeah. But it doesn't mean the review is updated because it has no recent citations of studies that have been conducted."
So fair to say that one of your criticisms of the PDQ at your last deposition was whether it was updated based on the most recent research?
A. That is correct.
Q. Okay. Let's go back to the PDQ -- the new

Page 43

PDQ that I just circulated.
A. 7?
Q. Yeah. There's a lot to keep track of.
A. Okay.
Q. Let's turn to the final page right at the bottom.
MS. PARFITT: Zack, if you could kind of give us a category.
Q. It's the last page of the document. It's not a category. It's, like, "Disclaimer," "Contact us," that stuff.
MS. PARFITT: Perfect. Thank you.
Q. Unfortunately, none of these Web pages are paginated, which makes it difficult. But you see "Updated October 16, 2023"?
A. That is correct.
Q. Okay. But I recall that one of your criticisms last time was that, even if it says it's been updated recently, it doesn't necessarily take into account all the scholarship. Was that correct?
A. Yeah. And that is sort of the methodology applied, what are the studies they have evaluated. And so even here, we can see that they have 13 references in the talc section.
Q. 14, I believe. But yes, I see that.

Page 44

A. Yeah. 13, 14. So the question is "What is the methodology they've applied," you know, before concluding anything in looking at, you know, all the ratios, study designs. So yes, obviously, if it is comprehensive, then yes, you know, it is relevant.
Q. So let's look at the talc section, which is a few pages back, not that many pages back. If we can look at the first short paragraph.
You agree that PDQ still believes the data are inadequate to support an association between perineal talc exposure --
MS. PARFITT: Objection. Form.
Q. -- and increased risk of ovarian cancer?
MS. PARFITT: Objection. Form. Misstates testimony.
A. Right. That is what PDQ states. I don't agree with their statement there, but that's what the PDQ --
Q. Understood. Okay. Can we look at the reference list?
A. Sure.
Q. Particularly 10 and 11 on the reference list. Can you read what 10 and 11 are for me?
A. Yeah. The meta-analysis and the pooled analysis by O'Brien -- meta-analysis by Dr. Woolen

Page 45

and the pooled analysis by O'Brien.
Q. Do you agree that those are two of the most up-to-date studies on the relationship between talc and ovarian cancer?
A. They are some of the most up-to-date, not necessarily the most updated. I mean, you know, there's meta-analysis by Penninkilampi. There's meta-analysis by Health Canada. So, you know, there's a causality assessment.
So there, you know -- there's all these OCAC consortium studies. There's OCWAA consortium studies. So there's many other studies that they could have looked at.
Q. Understood. Do you know of a meta-analysis more recent than Woolen's meta-analysis?
A. Yeah. But, you know, Woolen's meta-analysis is relevant. But it is relevant to the frequency. But, you know, the overall body of evidence -- case and control and cohort -- was Taher and Penninkilampi.
Q. Understood. Can you try to answer the question I asked, though, which is are you aware of a meta-analysis that's more recent than the Woolen meta-analysis?
MS. PARFITT: Objection. Asked and

Page 46

answered.
A. I don't follow the dates. I mean, whatever is in my report includes the relevant analysis from the date of previous report. There may be some -- you know, whether you're referring to Lynch, which is more updated or -- I don't know the exact date when it was published. But it is in my report.
Q. Okay. You'd agree that Lynch also concludes that talc does not cause ovarian cancer; is that correct?
MS. PARFITT: Objection. Form.
A. Yeah. Lynch concludes -- to be more precise, Lynch does not conduct a meta-analysis. They're only a systematic review. But yes, the inference is that it does not. And we can discuss why it concludes that and what are my concerns about it.
Q. I think we might get to that this afternoon.
A. Okay.
Q. On O'Brien, are you aware of any pooled analysis of cohort studies more recent than O'Brien?
MS. PARFITT: Objection. Form. Asked and answered.
A. Yeah, there are. I mean, the OCAC

Page 47

consortium, the OCWAA consortium. Not of cohort studies but case control studies.
Q. The answer with cohort studies is no?
A. No.
Q. Okay. So would it be fair to say that you don't believe that the references cited by the PDQ are comprehensive?
A. That is correct.
Q. Okay. Separate from whether they are comprehensive, do you believe they're up to date?
MS. PARFITT: Objection. Form.
A. I mean, if they're not comprehensive enough and they don't consider the whole body of evidence and don't do a causality assessment, as I have done, I don't know -- when they say "up to date," I really don't know, you know, did they consider everything and then decide to exclude Lynch or for some reason others? It's unclear why they excluded and included certain studies.
MR. MARTIN: Okay. Next exhibit, Luis, this is Tab 11 in our binders. This is 9.
(American Cancer Society printout, Exhibit 9, marked)
Q. You're familiar with the American Cancer Society, I assume.

Page 48

A. That is correct.
Q. Okay. Do you think it's generally a reputable organization?
A. It is a reputable organization, not "generally."
Q. Okay. Are you aware that they put out a "Cancer Facts & Figures" document every year?
A. Yes. I refer to it, you know, at times.
Q. And what we have in front of us is the one from 2024. This document is long, but it's mercifully paginated this time. Can we turn to page 22?
A. Yes.
Q. Okay. Can you review the two paragraphs there on page 22 under "Ovary"?
A. Yes.
Q. Okay. Do you agree with what it says here, that the incidence rate has declined by somewhere between 1 and 3 percent a year over the last 30 years or so?
A. Yes.
Q. Okay. Do you agree that that can be attributed to increased oral contraceptive use and decreased postmenopausal hormone therapy?
MS. PARFITT: Objection. Form.

Page 49

A. Those are one of the causes. There could be others. I mean, I think one of the others is, you know, better ascertainment. We are becoming much more aware of it, so.
Q. Can I ask you why better ascertainment would influence -- would impact the case rate?
A. Yeah. I mean, we are diagnosing it more, but the incident rate is declining.
Q. Okay. Can we turn to page 23, which is the next page. And can you review the paragraph for "Risk factors"?
A. Sure. Yes.
Q. Okay. So the first sentence there, "The most important risk factor other than age is family history of breast or ovarian cancer." Agree with the implication that the most important risk factor of all is age?
MS. PARFITT: Objection. Misstates testimony.
A. I mean, I don't know if I would say -- the most important other than age, they're saying, is breast or family history of cancer.
Q. Right. Would you agree that, by saying "other than age," that implies that age is the number 1 most important?

Page 50

MS. PARFITT: Objection. Form.
A. Okay. Yeah.
Q. Okay. And would you agree that the next most important is history of breast or -- family history of breast or ovarian cancer?
MS. PARFITT: Objection. Misstates his testimony.
A. Yes.
Q. Okay. Also lists a number of protective and additional risk factors below there.
A. That is correct.
Q. Okay. And the last sentence, "The weight of the evidence does not support an association between ovarian cancer and genital exposure to talc-based powder." Assume you disagree with the American Cancer Society about this.
A. Yes. Again, you know, partly because I don't see any references in how they came to that weight-of-evidence conclusion. Did they do a causality assessment? What are the studies that they evaluated to come to that conclusion?
Q. Have you ever told anyone at the American Cancer Society you disagree with them?
MS. PARFITT: Objection. Form.
A. Many times with CDC, with the American --

Page 51

lot of people disagreed with the CDC in COVID. So yeah.
Q. I understand you disagree. I'm asking if you've ever told anyone at the American Cancer Society that.
MS. PARFITT: Objection.
A. About this particular --
Q. About this particular issue.
A. No.
Q. Okay. You can put that aside. Do you recall giving an expert opinion in In re Viagra?
A. Yes.
Q. Okay. Did you testify in that case?
A. That is correct.
Q. Okay. I assume it wasn't in the last four years, though. That's why it wasn't on the list we went over earlier today?
A. That's correct. I think it was in my previous list.
Q. Okay. Understood.
A. If I recall, I mean, it was in my previous.
Q. Understood. Are you aware that, in 2020 after your most recent deposition, your opinion was excluded in that case?
A. I am aware.

Page 52

Q. Have you read the order that excluded your opinion?
A. I haven't read the full order, but I did read the portions of it relevant to my -- yeah.
Q. Makes sense.
MR. MARTIN: Could I have this -- which, Luis, is Tab 13 in our binders -- marked as Exhibit 10?
(Order from Court in Viagra case, Exhibit 10, marked)
Q. Let's turn to federal supplement page 796, 97, which is WestLaw page 14.
A. Yes.
Q. Last sentence of the first paragraph in the second column, "As Li 2014 was one of the smallest studies and its results have not been duplicated, Dr. Singh has not provided a persuasive reason to rely more heavily on it."
A. Where?
Q. Last sentence of the first paragraph on the second column. So agree that the Court excluded your opinion, in part, for placing undue emphasis on a smaller study?
A. That is correct.
MS. PARFITT: Objection. Form.

Page 53

Q. Okay. Do you believe you've done that in this case?
A. No. I mean, there's -- the evidence has been, you know -- that was one study. I mean, here we've had, what, four decades of -- not four. I don't know the exact time -- but several decades and several case control studies and, you know, overall body of evidence that provides for a causal opinion. And I've not emphasized one study as opposed to other, suggesting that, well, Li is, you know -- I've looked at the cumulative body of evidence.
Q. You do weight some studies more heavily than others?
A. Yeah. Strengths and limitations. Exactly.
Q. Can we go back to the end of the previous column?
A. Which is on --
Q. It's the same page, previous column here, "At the hearing Dr. Singh."
A. Yeah.
Q. "At the hearing, Dr. Singh candidly admitted that the Bradford Hill criteria are susceptible to an outcome-driven analysis, though he contends he did not take such an approach here." Do you still agree that the Bradford Hill criteria are

Page 54

susceptible to an outcome-driven analysis?
MS. PARFITT: Objection. Form.
A. That is correct.
Q. Still agree that you're not taking that approach here?
A. No.
Q. Okay. Next sentence, "Dr. Singh testified that the criteria are not ranked in any order of importance, which is contrary to the position he has taken in prior litigation and contrary to how it appears they are usually applied."
Do you believe there's any particular order of importance associated with the Bradford Hill criteria?
A. So, I mean, this sort of comes out of Dr. Bradford Hill's paper, which, prior to getting into the viewpoints, not even criteria -- so I, again, have -- it says "ranked in order of importance." So that's sort of his -- so when we use his viewpoints, you know, that's what his assessment was and -- yeah.
Q. So sorry. Just to make a clear record. Do you agree -- I think there's two questions here.
Do you agree, first, that Dr. Hill was -- ranked those viewpoints in order of importance?

Page 55

MS. PARFITT: Objection. Form.
A. I mean, the -- his article talks about these viewpoints in order of importance.
Q. Okay. Do you, Dr. Singh, believe that they can be ranked in order of importance?
A. They can.
Q. Okay. Which would you find to be the most important?
A. I mean, just go by, you know, strength of association. I have to look at the list.
Q. Understood. Do you believe that the same -- whether you want to call them viewpoints or criteria, are most important in every case? Or do you believe that -- you know what? Let's ignore that question.
A. So I can clarify, since you asked that.
Q. Yeah.
A. So while he listed the viewpoints, ranked them in order of importance, each criteria necessarily will not be important in each case, you know, taking it out of talc or -- you know, could be X associated with Y. In some cases, consistently and biologic plausibility may be enough to contribute to causation.
Q. So it depends on the particular

Page 56

relationship -- the particular association that you're looking at?
A. Exactly.
Q. Okay. How do you make that decision when you're looking at an association?
A. So you'd have to still rank them. But, you know, you're finally making a causal determination. And whoever is, they'd have to either make a rational argument that biologic, say -- I'm just using example of biologic plausibility -- is the -- is, you know, driving the causal assessment.
Q. Is that decision a subjective process, objective process, or partially subjective and partially objective?
MS. PARFITT: Just objection. Form.
A. No. Yeah --
Q. Can I redo the question?
A. I can answer that. Yeah.
Q. Is that a subjective or objective process?
A. So it, you know -- there is no quantitative way to weigh the Bradford Hill viewpoints. He never stated it that way, that you give 10 points to strength, 2 points to consistency, and 1 point to biologic plausibility.
It is not a subjective. I would say it is

Page 57

a scientific opinion based on, most of the time, there is quantitative data either to support or refute that opinion. In certain cases, there is no evidence.
MR. MARTIN: Can we have this marked as the next exhibit? This is, Luis, Tab 15 in our binders. It's Exhibit 11.
(February 2, 2023 transcript of Sonal Singh, M.D., M.P.H, Exhibit 11, marked)
Q. This is the deposition in the Tasigna case we talked about.
A. This is the recent deposition or --
Q. Let me look at the date on it.
MR. TISI: Just a question. Is this covered by any kind of confidentiality order? I'm not sure we would have access to it. Do you know --
THE WITNESS: No. This was admitted under Daubert.
MR. MARTIN: No. I understand the question.
MR. TISI: If it's covered by a confidentiality order, we didn't --
THE WITNESS: I don't have access to it either.
MR. MARTIN: I understand. I don't -- I

Page 58

don't believe so. But can we go off the record for a second and confirm that?

(A break was taken)

MR. MARTIN: Back on the record. So to follow up on the issue that was raised before, my understanding now is that we received these from a public records source. So I'm comfortable using them. So I'll redistribute these, which, again, are the depositions you gave in the Tasigna -- I'm sure I'm pronouncing that wrong -- MDL.

THE WITNESS: That's correct.

MR. TISI: Again, for clarification, these have redactions in it. I'm assuming --

MR. MARTIN: Those aren't redactions. Those are highlights.

MR. TISI: Okay. I got you. Okay. I didn't get a chance to look through it. Sorry.

MR. MARTIN: No problem. It does look exactly like sometimes things are redacted.

MR. TISI: Are those highlights your office did?

MR. MARTIN: Yes.

MR. TISI: So these were not in the filing --

MR. MARTIN: Correct. I was just trying

Page 59

to bring attention to myself and to Dr. Singh.

MR. TISI: I just want to understand what the highlighting's for.

THE WITNESS: Just so you know, I have not reviewed this.

MR. MARTIN: Understood. I'm just going to touch on it very briefly.

THE WITNESS: Sure.

Q. So if you can turn to deposition page 283, which is page 72 of the document. So if you can review where the highlighting begins down to the end of the page.

MS. PARFITT: That would be Line 11 down to 25?

MR. MARTIN: Correct.

MS. PARFITT: Continuing onto the top of.

MR. MARTIN: You do not need to continue onto the top of the page.

A. "Which of the"? Is that the question?

Q. Yes. The question and the answer to that.

A. The answers is "Temporality is important, strength of association, consistency, plausible" -- now you're listing all of them. Yeah.

Q. So my question with this document is

Page 60

whether you still believe that they're all important, you have to apply them qualitatively?

MS. PARFITT: Actually, that misstates his testimony.

A. Yeah. And you have to look at the report. I mean, all of them were applied, and all of them are important. But, obviously, in certain contexts, some of them may be more relevant than others.

So I don't see any -- you have to look at the report. I mean, you can't look at this document in isolation. We should bring that -- you know, if you pull that off, you could have -- I'm sure you have the report.

Q. I do.

A. Let's look at the report and see.

Q. No. Again, it's not intended to be a gotcha question. I'm trying to understand the scope of your opinion.

A. Yeah. You have to look at all of that. And then, you know, you have to decide, you know, which in certain cases -- for example, dose response. It may not apply. If a drug is given at one dose, how will that apply? I mean, you look at it, but it may not be relevant.

Q. If a drug is given in multiple doses, do

Page 61

you believe dose response is an --

A. Yes.

Q. -- important criteria?

A. Yes.

Q. Can we look back at your report in this case?

MS. PARFITT: Just for the record, it's Exhibit No. 5.

A. 5.

Q. Okay. Does the November 2013 (verbatim) report contain all of the opinions that you plan to give in this case that are not included in your previous 2019 report?

A. 2023, to correct. It was not 2013.

Q. Thank you for fixing that.

A. No. I think, you know, these are linked reports. I mean, it's not that I'm -- I think I'm providing testimony on the update between the 19th and 23rd in this report. Maybe you can restate the question. I'll try to answer it.

Q. Understood.

MR. TISI: You said "the 19th."

MS. PARFITT: Let's redo dates here.

MR. MARTIN: Yes.

Q. Do the 2018 report and 2023 report together

Page 62

define the full scope of the opinions you plan to offer?
A. That is correct.
Q. Okay.
A. Sorry about dates.
Q. No. Understood. Can we turn to page 4 of the 2023 report. So you say in page 4 that you use the weight-of-the-evidence approach in examining the causal relationship. Can you define for me what you mean by weight-of-the-evidence approach?
A. The weight of evidence is, you know, gathering all the relevant body of evidence to the specific scenario and the cumulative body of scientific and medical evidence for a systematic review based on animal studies, in vitro studies, human studies -- including epidemiologic studies -- and then -- including published, most of the time, you know, peer-reviewed documents, other documents which -- then examining them for whether they are relevant and reliable to the present -- the context and then examining them through the lens of the Bradford Hill viewpoints.
And, obviously, these are -- there is no quantitative way to say that strength of evidence gets 7 points and, you know, biologic plausibility

Page 63

gets 1 and dose response gets 2.
Q. To the extent you draw causal conclusions in your professional work, is this the same methodology that you use in your professional work?
A. So my professional work is clinical; right? So I see patients. So we use the differential diagnosis as -- we don't necessarily -- we don't have to make causal determinations when I see patients.
Q. Understood. But I guess I was referring to your published academic work. To the extent you draw causal conclusions in your publications, is it the same methodology that you use?
A. Yeah. I mean, if you are going to draw causal conclusion, you would use -- I mean, Health Canada has used the same approach. They've used a weight-of-evidence approach. So they may have defined it differently, but they have used a weight-of-evidence approach.
There are other approaches. I mean, you know, it's not, like, the only approach. I'm being transparent about what I've gathered, what I've used, and how I rate it. I've rated certain viewpoints more than others. And that's, you know, that's my approach.

Page 64

MS. PARFITT: Zack, I'm not sure exactly where you're going. I've giving you a little runway. I think, you know, from 2018, we talked quite a bit about how to make a causal inference using Bradford Hill criteria.
MR. MARTIN: Understood.
MS. PARFITT: So, again, giving you some pretext but --
MR. MARTIN: Understood. Understood. Yeah. I don't want to rehash things we've already done.
MS. PARFITT: Right. I'm looking at his prior deposition, so.
Q. Do you believe the methodology you used in this 2023 report is the same as the methodology that Health Canada used in their report?
MS. PARFITT: Objection. Form.
A. In general, yes. I mean, I'm not -- you know, I didn't do exactly the same thing. I actually relied on Health Canada so I didn't have to redo what they had to do. So in a lot -- in the majority of, you know, bodies of evidence that they appraised, you know, they appraised, you know, the O'Brien study. They appraised a lot of the mechanistic studies. So I relied on them.

Page 65

But their -- in terms of assessment, yes. I, you know -- to my best knowledge, I was, you know, applying the weight-of-evidence approach.
Q. You mentioned that you conducted a Bradford Hill analysis in your 2023 report. You also conducted one in your 2018 report. And your opinion in 2018 was that the evidence was sufficient to reach a causal conclusion. Why did you feel the need to conduct an additional Bradford Hill analysis in 2023?
MS. PARFITT: Objection. Form.
A. So evidence was sufficient to reach a causal conclusion at that time. But when I was asked to update my report, I -- this is not something of my own choosing. I was asked to do it.
And so I could not just look at the body of evidence and, you know, at the end of -- say "Well, you know, I agree with what I said then." So I had to look at it through the lens of what is known in the previous time, what is here. So I would have to do the Bradford Hill analysis.
Q. So is it fair to say that your opinion is that, given the intervening new science, you felt it important to do a new Bradford Hill analysis?
MS. PARFITT: Objection. Misstates his

Page 66

testimony.
A. No. I think that whatever I evaluated from 2019 -- let's get the dates right -- until, you know -- 2018 was my report -- then 2023, this new search, I felt that, since I was going to provide a causal opinion, updated causal opinion, while at that time, you know, the opinion, you know, body of evidence was sufficient -- if you're looking at a body of evidence and, again, arriving at a causal opinion -- then, you know, I had to be transparent in my assessment. I could not, for example, end at page 2 -- 17 and just give you a one-line conclusion.
Q. Can we look at page --
A. This is my report; right?
Q. Yes, it is.
A. Which page is it?
Q. Well, I guess I'll ask a general question. You can look through your report.
Do you agree that, in your 2023 report, you assigned less weight to the factor of dose response or biological gradient than some of the other factors?
A. Let me just look at the wording that I used.

Page 67

Q. Yes. It's on page 21.
A. Yes.
Q. Okay. And can you point to any literature suggesting that it's appropriate to weight the dose response factor less than the other factors?
MS. PARFITT: Objection. Form.
A. So it is not that -- it is -- I'm trying to be transparent on -- for example, there's no literature to suggest that experiments should be -- you're not going to get experimental data on this question.
So, of course, I weighed -- it's my weighting of the factors. Does not mean that those dose response is not -- I evaluated dose response. There were some -- you know, several studies which provided dose response; some studies did not.
So I weighed -- so my -- I think I have to be clear that my assessment -- the factors driving my assessment are consistency and strength of evidence, temporality, plausibility, and coherence.
So dose response is also there but to a lesser -- so it's my assessment of the viewpoints. It's not necessarily, you know -- you're right. There's not literature suggesting that dose response should not be used in assessment.

Page 68

Q. All right. Thank you. Are you offering the opinion that cosmetic talcum powder contains asbestos?
A. So my causality opinion's not predicated on presence of asbestos in talc. But as was noted in my previous report and in my present report, I'm aware of studies that provide evidence that talc may contain asbestos.
Q. Which studies are you relying on for that?
MS. PARFITT: I guess I'll give a bit of leeway. Again, this area was examined at his prior deposition, 2019.
THE WITNESS: Let me answer.
MS. PARFITT: I'm giving you context -- I'm giving you a little leeway. Go ahead, Dr. Singh.
THE WITNESS: I have to find it now.
MS. PARFITT: Take your time.
Q. It's on page 13, I think.
A. Let's see. I just want to be precise by my language. Yeah. So the studies I'm relying on are the FDA testing, testing by -- that was cited in the previous report, I think, Johnson & Johnson testing, and then obviously the testing by Dr. Longo and Rigler and now, subsequent to this, the EPA

Page 69

conclusions about the presence of asbestos in talc.
Again, I'm not a mineralogist, but several lines of evidence -- in fact, even epidemiologists have at least acknowledged and are starting to interpret the evidence that -- for example, O'Brien in a recent paper on fibroids said that, you know, talc may be contaminated with asbestos.
Q. Let's break that down --
A. Sure.
Q. -- one by one. You mentioned an EPA study that you said was subsequent to -- do you mean subsequent to your report or subsequent to your previous deposition?
A. No. Subsequent to my report. Like, this EPA -- not study. It's an EPA ruling.
MR. MARTIN: Was that in the materials that you gave us Monday?
MS. PARFITT: Yes, it was.
THE WITNESS: That's the EPA ruling. I mean, it just came out -- what -- a couple of weeks ago?
MS. PARFITT: Yes.
THE WITNESS: But we have to bring it out. I don't remember.
MR. TISI: If you want a copy, I can get

Page 70

a copy.
MR. MARTIN: If you have one handy, I'll take a quick look at it and review it over the break.
MR. TISI: Sure.
THE WITNESS: Yeah. This was not included in my citations.
MS. PARFITT: For the record, it was, in fact, provided in the Dropbox, just for the record. And we will give you a copy.
MR. TISI: I'd appreciate if you are able to give it back because it's my only copy.
MR. MARTIN: No problem. I can probably get it from the Dropbox.
MR. TISI: Can I just check something, make sure I don't have writing on it?
Q. Let's talk about the FDA. Are you referring to the 2019 FDA findings that prompted a recall?
A. Yes.
Q. Okay. Do you know how many samples the FDA tested in 2019?
A. I don't remember, off the top of my head. But it was something bot -- so there's a distinction between samples and bottles.

Page 71

Q. Understood.
A. You're asking about samples or bottles?
Q. I will ask about samples first.
A. Yeah. I don't recall exactly. But it was something about -- it's approximate -- I don't like approximations. It was 52 or -- yeah. I don't want to approximate.
Q. Okay. Understood. If the answer is "no," that can be the answer.
A. Yeah. Yeah. I don't --
Q. Do you know what percentage of those samples tested positive?
A. No. I can't recall.
Q. Okay. And do you know how many samples of J&J baby powder have been tested by the FDA in history?
MS. PARFITT: Objection. Form.
A. No, I don't. I don't. I know that there have been many.
Q. You don't know how many of those tested positive in history?
A. No.
MS. PARFITT: Objection. Asked and answered.
Q. Okay.

Page 72

A. And I will not be testifying to testing of talc and presence.
Q. Understood.
A. And quantity of -- sorry -- quantity of asbestos and --
Q. Understood. Have you personally reviewed the testing done by Drs. Longo and Rigler?
A. Yes. I reviewed the report.
Q. You reviewed the report?
A. Yeah. I -- you know, I reviewed the methods. And to the extent I can understand it, I understood it. But I'm not expert in that area.
Q. Have you reviewed any testing -- asbestos testing performed by defense experts?
A. Yeah. I've seen their -- I don't know if it's exhibits. I don't know if I've seen their testing.
Q. Have you seen their reports?
MS. PARFITT: Again, if you could be a little more --
Q. Have you seen the report of any defense expert who performed asbestos testing?
A. No, I have not.
Q. Okay. Do you believe that you're qualified to weigh -- let's strike that question. Start over.

Page 73

Do you know what X-ray diffraction is?
A. No, I don't.
Q. Okay.
A. I think we should stop at that line of questioning. I mean, you can ask. You can ask.
Q. I just like to get a record. Polarized light microscopy?
A. I mean, I know the name. I can tell you what TEM was. But how is that performed? No, I don't.
Q. That was -- the question is do you feel like you're qualified to weigh the strengths and weaknesses of those forms of asbestos testing?
A. No.
Q. Okay.
A. I know TEM is better. I mean, I read.
Q. What do you read that says TEM is better?
A. The FDA's, you know, moving towards TEM. Again, I don't want to get into that area of testing. Yeah.
Q. Well, I think it's important, if you're going to offer an opinion about whether talc takes -- contains asbestos, that we understand what that opinion is based on.
A. Yeah. I mean, the opinion is based on, you

Page 74

know, these citations, the EPA report and their, you know -- they would be the experts to answer whether, you know, the methodology was appropriate. I mean, I -- on my reading, it appears to be appropriate.
Q. When you say "they," are you referring to Drs. Longo and Rigler?
A. Yes.
MS. PARFITT: He mentioned IARC. He mentioned EPA.
Q. Let me ask it as an open-ended question. When you said "they" in that question, what were you referring to?
A. Yeah. When -- obviously, the evidence I cite is from the FDA. I mean, so you can go to the FDA. You can go to Longo and Rigler. You can go to, you know, the EPA and look at their methodology and provide -- yeah.
Q. Let's turn to page 14 of your report.
A. Sure.
Q. The final paragraph before Section 8, so final paragraph of Section 7, beginning with "Vimercati, et al."
A. Yeah.
Q. You say that Vimercati is a case series with four cases: Two with talc exposure, and one

Page 75

with an identified amphibole fiber of tremolite. Is it your standard practice to draw causal conclusions from a single case report?
MS. PARFITT: Objection. Asked and answered.
A. No. I'm not drawing any causal conclusion from that single -- I mean, again, the causality assessment is based on the whole body of evidence. You know, I did a supplement. I found studies. So I noted it. So, you know, that one study or case series is not going to drive the causal assessment.
Q. So the answer to the question is no; but, also, you didn't do that here.
MS. PARFITT: Objection. Misstates his testimony.
A. What do you mean by -- ask the question. Ask the question. Of course, I have to cite. If the studies are there, you have to cite the study. But the causality assessment is not based on this. It is not even predicated on the presence of asbestos, you know.
Q. Understood. At your last deposition, you said you were not familiar with the term "cleavage fragments." Is that still the case?
A. Yes.

Page 76

Q. Okay. At your last deposition, you said that you would not be offering an opinion on the quantity of asbestos exposure necessary to cause ovarian cancer. Is that still the case?
A. That is correct.
Q. Okay. You mention here "retrograde migration of talc." Are you going to be offering an opinion that talc can reach the ovaries through inhalation?
A. I mean, I -- some have suggested that. Like, for example, Schildkraut suggests that in her paper, the AACES study. I am, you know -- that's one biologic plausibility opinion that I, you know, included in my 2018 report -- 2018? Yeah.
MS. PARFITT: 2018.
A. That's one plausible mechanism.
Q. Do you have an opinion related to fibrous talc?
A. I mean, I have an opinion related to whatever's in the bot -- you know, I was examining the association. I was not disaggregating talc, talc containing asbestos, fibrous talc. You know, what's in that bottle, whatever's -- the studies reported, I'm not going to be able to disaggregate those components of talc.

Page 77

Q. Who drafted your 2023 supplemental expert report?
A. Me, me, and only me.
Q. You wrote every word in it?
A. Every single word in it.
Q. Okay. Did you have any discussions with lawyers before you drafted it?
MS. PARFITT: Objection to any discussions with counsel as to the content.
Q. Okay. Can you answer that as a yes-or-no question without telling me the content of those discussions, if they exist?
MS. PARFITT: Just so I understand, Mr. Martin -- I'm not being difficult -- but have we talked to him since his 2018 report when we asked -- advised him that the Court required an updated report? Help me out here. Of course we've talked to him.
Q. Okay.
A. Yeah, I did have a discussion. Yeah.
Q. Okay.
MS. PARFITT: We talked to him about coming to this deposition.
MR. MARTIN: I'm sorry. I meant in advance of drafting the 2023 report.

Page 78

A. Yeah. They had to -- because if I hadn't known it, I wouldn't have drafted it. There would have to be a discussion.
Q. Do you remember approximately how many discussions you had?
A. It was -- that should have been noted in my thing because --
Q. Fair point. If you had a discussion, it would be noted on the invoice?
A. I noted discussion separately and my review separately, I think.
Q. Let me just check and make sure that's right.
A. I hope I did.
Q. Sounds right but -- telephonic consultation?
A. Yes. So that's the discussion.
Q. Understood. Did you personally identify all of the documents included in your -- all of the documents on the reference list of your 2023 report?
A. The majority. They did provide some additional documents, for example, you know, the depositions and, you know, Longo's testing so -- and the EPA testing. I mean, I had heard about the EPA test, and I had it. But I didn't have the full text

Page 79

of it.
Q. When you received materials from counsel, did you ask for those? Or were they provided to you without asking?
A. Some of them, like, I asked them to source the references because, you know, I didn't have it in my library. So I may have asked one or two references for them to source it. Like, I had identified it, but in some cases they did provide it.
Q. Let's look back at your report, page 3. In that box there, that contains the search terms that you used to identify new articles for your deposition?
A. Yes.
Q. Okay. And all the articles that were responsive to those search terms are included in Appendix A to your report; is that right?
A. Yeah. And the ones that I excluded are -- there's two lists; right? There's an included and relevant list. And there is a potentially, you know, excluded is -- the, you know -- the -- some of them may have been cited for context. But the ones in the references are the main articles that are relevant to this report.

Page 80

Q. Understood. So can we turn to Appendix A?
A. Which is?
MS. PARFITT: We're referencing the '23 report?
Q. Right. Appendix A of the 2023 report, which follows the reference list.
A. Okay. Yes.
Q. Were any studies -- let me back up.
There are no rows for which I see multiple Xs under -- let me back up further.
The chart includes two columns under "include" and several columns under "exclude." The "exclude" columns would be reasons for which you excluded literature that you identified in your search; right?
A. Sure.
Q. Okay. And if you listed an article and there was an X under an "exclude" category, that was the reason you excluded it?
A. Yeah. So just to be clear -- and I think I explained that -- article could be -- have been excluded for multiple reasons. But that Appendix A just denotes one reason.
For example, article could have been a duplicate and not have original data as well. But,

Page 81

you know, that is as transparent as I could be in terms of that.
Q. You anticipated my next question. So thank you. What was your basis for excluding an article as nonrelevant?
A. Well, so I state that in the report. So we should look at that. So, I mean, in the section on "eligibility criteria," I included epidemiologic studies --
MS. PARFITT: That's page 3.
Q. Yes.
A. -- which provided data, so they had to provide data on association. I included study designs. I included, you know, the cohort studies, case control studies, umbrella reviews, systematic reviews, meta-analysis, pooled analysis.
I examined the references to find additional articles which provided data. I also included studies that reported on biological mechanisms and causal pathways that either supported or refuted the role of talc. And this could include different study design.
When I say, after consideration, I excluded narrative reviews or opinion articles that did not provide original articles -- original data that are

Page 82

not deemed relevant, some of them were cited for context, so -- but in terms of the -- you know, my opinion, I am focusing on, you know, systematic review that have studies that provide data.
Q. How do you define "cited for context"? What exactly do you mean by that?
A. Well, they are cited. You know, they are cited in the report. Yeah.
Q. But you seem to be drawing a distinction between "cited for context" and "cited substantively"?
A. Yeah.
Q. Can you explain what you mean by the distinction?
A. Sure. For example -- and I have to, you know -- I don't want to make sort of assumptions about anything. But, for example, let's see -- I don't -- I can't come up with -- but, you know, it will be, like, response to an article which explains, you know, the underlying -- yeah. So, for example, if you look at -- let's see if I can explain this better. For example -- I can't find that.
Q. We can --
MS. PARFITT: Just give him a moment.

Page 83

He doesn't mind.
A. Yeah. I mean, there are -- I'm trying to look through the list of excluded articles.
Q. I'll withdraw the question.
A. No. No.
Q. I don't want to spend time on this. I don't want to spend time on this. I'll withdraw the question.
MR. MARTIN: Can we take a break? Off the record.
(A break was taken)
MR. MARTIN: Back on the record.
Q. We were looking at Appendix A to your 2023 report when we broke. And can we look at Row 29 of this?
MS. PARFITT: Row 29 of Appendix A?
MR. MARTIN: Yes. Which should be Goodman, et al.
THE WITNESS: Yeah.
MS. PARFITT: For the record, if you don't mind, since there's two Goodmans. Goodman '23?
MR. MARTIN: No. Goodman 2020.
MS. PARFITT: 2020. Thank you.
Q. It's entitled "A critical review of talc

Page 84

and ovarian cancer."
A. Sure. Sure.
Q. You have this marked as not relevant because it is not a systematic review or meta-analysis; is that correct?
A. That is correct. And does not provide original data. Yeah.
Q. Okay. Let me ask you about original data. So -- okay. Yes. So it would be relevant if it provided original data, on the one hand, or if it was a systematic review or meta-analysis on the other hand.
A. Yes. Exactly. So, for example, I mean, in terms of context, you know, if you look at 62 -- I'm trying to answer -- your question is -- where is that Rosner -- 77, Row 77. It's also excluded. It does not have original data. But that is, like, a citation for context. I'm trying to explain why, you know, because, you know, it was excluded.
Q. So going back to 29, Goodman 2020, it's entitled "A systematic review." Can you explain to me the difference between a systematic review and a -- I'm sorry. It's entitled "A critical review." Can you explain to me the difference between a critical review and systematic review?

Page 85

A. Sure. You know, a systematic review would provide search dates, would provide what are the studies they included -- you know, similar to what I have here -- would provide criteria for inclusion, exclusion and, in many cases, assessment of bias and, if the data are appropriate, do a pooled analysis or -- meta-analysis. Sorry.
Q. Let's look at Row 27. This is one that you did include as relevant; right? This is Gabriel, et al., "Douching, talc use, and risk for ovarian cancer and conditions related to genital tract inflammation," 2019.
A. Which is --
MS. PARFITT: 27, Gabriel.
MR. MARTIN: Let's introduce this as an exhibit.
Q. Sorry. So let's just look at your report, again, page 12.
A. Okay.
Q. So this is the same document, just going back to the body of it. You described this as a case control study in the body of your report, so not a systematic review or meta-analysis; right?
A. That's what I state here.
Q. Okay. But it's included because it

Page 86

contains original data?
A. Yeah.
Q. Just wanted to --
A. Sure.
Q. -- put a finer point.
A. I have to look at -- I want to make sure I have it in front of me if you're going to ask specific questions.
Q. Understood. We will probably return to it later today, but that was the only question I had at this point. Let's go back to Appendix A, Row 92. Sorry. There's a lot of flipping through paper today.
A. That's okay, as long as I have it in front of me.
(2021 article by Nicolas Wentzensen, et al., Exhibit 12, marked)
Q. This is Wentzensen, O'Brien, "Talc, body powder, and ovarian cancer: A summary of the epidemiological evidence" from 2021 --
A. Yes.
Q. -- published in Gynecologic Oncology.
A. That is correct.
Q. Do you think Gynecologic Oncology is a reputable journal?

Page 87

A. Yes.
Q. Have you cited things from it?
A. Yes.
Q. I think you cited some things from it in your expert report.
A. Yes.
Q. Do you know by -- the reputation of either Dr. Wentzensen or Dr. O'Brien?
A. No. But I've read a lot of the articles.
Q. Do you have any reason to believe that they'd be biased one way or another?
MS. PARFITT: Objection. Form.
A. I mean, biased in the terms of, you know, what kind of bias? You know, bias works in different forms. Financially? No. They work at, as far as where, you know, NCI.
But there are other sources of bias, like confirmation bias. You know, researchers publish findings. And then there are subsequent study -- they pattern these findings.
So, you know, I'm not saying that's what they have. But there are different kinds of biases operational in the literature. And I'm not saying something totally out of the ordinary. That's well established in the scientific literature. Yes. So

Page 88

depending on bias --
Q. Let's talk about financial bias specifically. Are you aware of any financial bias they have?
MS. PARFITT: Objection. Form.
A. No.
Q. Okay.
MR. MARTIN: Let's mark this as an exhibit. This is the Wentzensen, O'Brien article I just mentioned. I have a wrongly paginated version of this, unfortunately.
THE WITNESS: I read it. So you can point --
MR. MARTIN: I understand. I need to find my place in it because I have it paginated differently in my outline than it is here.
MS. PARFITT: Sure.
Q. If you can look at page 8 of the document, halfway through the second paragraph of the conclusion.
A. Give me a second.
MS. PARFITT: Page 8.
Q. Specifically the sentence that starts "Taken together, the epidemiological data from case control studies and cohort studies" --

Page 89

A. I'm sorry. I'm not there.
Q. Let me know when you get there.
A. Page 8 where? Second paragraph?
Q. Second paragraph of the "conclusion" section.
A. Second paragraph. "Taken together." Okay. Got it.
Q. "Taken together, the epidemiological data from case control studies and cohort studies suggest that there may be a small positive association between genital powder use and ovarian cancer, which may be limited to women with patent reproductive tracts."
Do you agree with Wentzensen that there's a small association between genital powder use and ovarian cancer?
MS. PARFITT: Objection. Form.
A. I mean, I'm not going to qualify it. But, you know, they provided and other studies have provided evidence that, based on the biological mechanisms, there is a positive association between genital powder use and ovarian cancer in women with patent tracts.
Q. You mentioned in that answer "biological mechanism." Is biological mechanism relevant to

Page 90

consideration of an association, or is it relevant to consideration of causation?
A. I mean, yeah, causation.
Q. Okay. Do you agree with the statement that it may be limited to women with patent reproductive tracts?
A. I mean, that is one possible biological mechanism. But, you know, if -- and, again, we went through this before. But if the other -- there are other biological mechanisms such as inhalation, then, you know, it may not be limited.
Q. I guess I'm not asking at this point for a discussion of biological mechanism. Do you believe that the associations shown in the literature are limited to women with patent reproductive tracts?
MS. PARFITT: Objection. Form.
A. Not necessarily. I mean, her study broke it down, and some of the more recent studies have. And that is probably the most likely biological mechanism. But other studies have shown in, you know -- the earlier studies did not adjust for patent tracts. And they still showed -- so if we would rely on those studies, then yes.
Q. Presumably, those studies would include women both who have had tubal ligation or

Page 91

hysterectomy and those who have not.
A. Exactly.
Q. And you just used a pronoun in the last answer. You said "she." I assume you mean Dr. O'Brien, one of the co-authors in this paper.
A. I think she's a "she."
Q. Her name is Katie. I'm going to make that guess.
A. I also made a guess. I have not met her.
Q. In the same paragraph, the sentence that follows, "Data from a large case control study suggested that associations between talc use and ovarian cancer were largely confined to premenopausal women and postmenopausal women who used hormone therapy." And the citation is 39, which is Cramer 2016.
I believe you may have said this in your report. But do you agree with Cramer and Wentzensen that the association is limited to premenopausal women and postmenopausal women with hormone therapy?
MS. PARFITT: Objection. Form.
A. You have to point me where I wrote that. But, I mean, I see that study and I -- you know, this was -- this study was cited in my previous report. But I want to make sure that -- what is the

Page 92

statement that I'm being asked to comment on.
Q. Let's just move on. I don't need to dig through your report for it.
Next paragraph of this "conclusion" section, the second sentence which -- the third sentence, actually, "However, the experimental and animal carcinogenicity data for talc are limited and inconclusive. There are currently no good animal or experimental models of ovarian carcinogenesis that could be used to more directly test biological effects of talc."
A. Where are you?
Q. I apologize. It's two sentences down.
A. Got it. Yeah.
Q. You see where it is --
A. Yes.
Q. Okay. The question I have is whether you agree that there are currently no good animal or experimental models of ovarian carcinogenesis.
MS. PARFITT: Objection. Form. Misstates his testimony.
MR. MARTIN: The question is whether he agrees.
A. So I think, you know, assessment of causality is, you know -- she -- she's making a

Page 93

statement. Does not make a -- you have to examine animal models. You have to examine experimental models, but it is really about biologic plausibility.
And she, actually, in a recent paper on fibroids provides the best example of an experimental model where she talks about migration, inflammation and epithelial cells. And we can initiate a series of mutagenic events that can lead to cancer as well as -- and if -- which is even worse with asbestos.
So in my mind, that's an experimental model. I'm not sure what experimental model -- that term means. Is it some -- you know, I don't know if she is thinking about every step in the carcinogenic process. I don't really know what the term means.
Q. Let's focus on -- do you agree that there are no good animal models of ovarian carcinogenesis?
MS. PARFITT: Object. Objection. Misstates the prior testimony.
A. Yeah. I'm not aware of good animal models.
Q. Halfway down the same paragraph -- and I'll slow down this time to make sure everyone is there --
MS. PARFITT: Thank you.

Page 94

Q. -- it's the sentence starting "Other components."
A. Yes. I have it.
Q. Okay. "Other components of body powder, including cornstarch, could also possibly play a role in carcinogenesis by inducing inflammation in the reproductive tract. But carcinogenicity data are lacking." Do you have an opinion about the carcinogenicity of non-talc components of body powder?
A. I have not evaluated that.
Q. And body powder that is not -- cornstarch body powder you have not evaluated.
A. I've used "genital talc," yeah.
Q. So there's a different product that is cornstarch body powder. You haven't evaluated that?
A. No. I mean, some of the studies talk about it. But I haven't eval -- my opinion is limited to genital talcum powder use.
Q. The next sentence -- the next two sentences, "Confounding by indication may explain some of the observed associations. This would occur if women with hormonal or inflammatory exposures or conditions that are associated with ovarian cancer were also more likely to use body powder in the

Page 95

genital area."
The first question is whether you agree that confounding by association is a possibility to be considered.
MS. PARFITT: Objection.
Q. Excuse me. That confounding by indication is a possibility to be considered.
A. Yeah. And, you know, A, you have to consider it in epidemiologic studies of association, any kind of confounding. And you have to consider confounding by indication.
I'm not sure this would be operational because we are talking about exposure outcome relationship that takes years. We're not talking about you use it, you know, today and you have cancer tomorrow.
So, you know, if women had irritation in something and they had the first symptoms of -- so it's really about -- "confounding by indication" is a very specific term. And it means that you are using it for indication for that disease.
And, in fact, there's good studies to suggest that, you know, it is more operational when you're thinking about drugs and efficacy, you know, like, ACE inhibitors and stroke and something that

Page 96

provides benefit. It is less operational when you're thinking about harmful effects.
So I don't think confounding by indication is a consideration. There could be a consideration about confounding, per se, but not necessarily confounding by indication; or if it is, it's very low.
Q. Do you think it's possible that obese women are more likely to use talcum powder than nonobese women?
MS. PARFITT: Objection to form.
A. You would have to have data showing that, you know, it is -- you know, that -- you know, obesity is a risk factor for -- you know, we know that. But the question then would be is -- are women that are obese -- you'd have to fulfill the criteria for confounding.
You have to have obesity association with cancer -- we know it is, several studies -- obesity association with exposure, in this case, and then obesity not mediating the pathway. You'd have to go to specifics. But that is not confounding by indication. That's not an indication for ovarian cancer. That's confounding, yes, but -- and you have several studies have adjusted for that.

Page 97

But I disagree with her about confounding by -- I think she's using the term very generally but not specifically. She could have been more specific about confounding.
Q. Okay. Can you -- and I appreciate the context. But can you just try to give a yes-or-no answer to the question of whether you believe it's possible -- not established but possible -- that obese women are more likely to use talcum powder?
MS. PARFITT: Objection. Asked and answered.
A. I don't -- I have to look at the data and say.
MS. PARFITT: You've answered the question.
Q. Can you review the first paragraph on the next page -- just let me know when you've reviewed it -- beginning "Independent of the underlying cause"?
A. Yeah. Yes. First paragraph. Okay.
Q. Yeah. Second sentence, "The low relative risk translates to a very low absolute risk increase, given the rarity of ovarian cancer" and then later down the page, "Given the widespread use of powders and the rarity of ovarian cancer, the

Page 98

case for public health relevance is limited." Do you agree or disagree with the statement that the case for public health relevance is limited?
A. I disagree because that's, you know -- the reason I disagree is, you know, it's not just about relative risk. And it's not just about the prevalence of exposure. And as you know, we've seen studies, many studies, where they talk about give or take there are 20,000 incident ovarian cancers in the US and -- annually and the PAR.
So at least at the population level, you are getting -- Davis and Wu provide an estimate. And I don't recall the specifics, but we can look at that. So that means there is a preventible cause of risk factors. Why would that -- why wouldn't it be relevant for public health?
MR. MARTIN: Can we go off the record for just a moment while I go through my notes?
(A break was taken)
MR. MARTIN: Back on the record.
Q. Can you turn to page 4 of the Wentzensen article we were discussing before the break? The First sentence of 4.1, "Ovarian cancer is characterized by profound heterogeneity that can be observed in site of origin, genetic susceptibility,

Page 99

somatic mutations, molecular pathways, risk factor associations, and morphologic differences." Do you agree with that statement?
A. Yes.
Q. Do you agree that that statement is true for epithelial ovarian cancer specifically?
A. I mean, that's what I think she's talking about; right? She's talking about --
Q. But we talked earlier about your opinion that talc causes all epithelial ovarian cancers.
A. Yeah. Because that's what I evaluated.
Q. And did you consider this heterogeneous nature of ovarian cancer as part of your opinion?
A. My -- you know, so my overall opinion was based on whatever the studies reported on and -- which included these various cancers. When notable, I did note -- for example, if you go back to my previous report, I did note what specific cancers they were reporting on. But I did not disaggregate that particular -- that talc only is associated with X and Y.
Q. Would you agree with me that the overwhelming majority of epithelial ovarian cancers are serous?
A. Yes. By, you know -- just by prevalence.

Page 100

Q. Okay. Does the fact that talc is associated with various subtypes of cancer affect your analysis of the specificity criterion of the Bradford Hill analysis?
MS. PARFITT: Objection. Form.
A. Can you restate? Sorry.
Q. Sure. One of the viewpoints that Dr. Hill talks about is specificity; right?
A. Yeah.
Q. Okay. And we just talked about the fact that epithelial ovarian cancer contains several subtypes.
A. Sure.
Q. Does the fact that it contains several subtypes -- let me start that one over.
Did you consider the fact that it contains several subtypes when you were evaluating the specificity viewpoint?
A. I don't think that that is, you know, the relevance of -- if you -- and we should pull the Bradford Hill article. I don't know what the reference -- can we pull it out?
The reason I'm saying that is I don't think that is the consideration there. It's more the consideration of "Is that etiology the only cause of

Page 101

that cancer or whatever outcome?" So it's that -- just because it's etiologic heterogeneity I don't think -- and in any way, you know, I did not weigh specificity very heavily, because, in fact, I don't -- I can look at the exact words -- because ovarian cancer has multicausal, you know, risk factors so -- but it's not because of the fact that it is etiologic, you know, heterogeneity. It's just that there are different causes.
Q. Okay. Can you explain to me the difference between different causes and etiologic heterogeneity?
A. Yeah. I mean, different causes are, like, you know -- like, say if you say -- I don't know -- "What are the established risk factors?" You know, we could go back and look at a list and say, you know, "Obesity increases the risk of causes of ovarian cancer." Those are causes.
For a moment let's, you know, think that obesity -- but that does not get into etiologic heterogeneity. Here, we are talking about different types of cancer. That's etiologic heterogeneity.
Q. Okay. So this Wentzensen and O'Brien article, you exclude it because it's not a meta-analysis or original data; right?

Page 102

A. Yeah. I mean, you know, it is important. It's, you know, included in my list of -- I reviewed it. But it did not provide original data. I mean, most of the opinions are, you know, derived from the previous publication that are included and considered, you know. So it's not excluded in that sense. But it is in my list of reviewed documents.
Q. Are you aware of a different article by O'Brien, Wentzensen along with Ogunsina and Sandler entitled "Douching and genital talc use: Patterns of use and reliability of self-reported exposure"?
A. Yes.
Q. Okay. I did not see that on your reliance list. Did you review it in drafting your expert report?
A. I know I'm aware of it. I don't know when I reviewed it. But yeah, I did review it. Yeah.
Q. Okay. Is there a reason it wouldn't be on your reliance list?
A. You know, it could -- I'll have to look at it and see why not but -- what was the year of publication?
Q. 2023.
A. Okay. When in '23?
MR. TISI: I think it was December 2023,

Page 103

if I'm not mistaken.
THE WITNESS: It could be earlier.
MR. TISI: But I think it is December.
MR. MARTIN: It says "May 2023" here.
MR. TISI: Maybe I'm wrong. I apologize.
THE WITNESS: Yeah. Let me just -- May 2023 -- what is the title?
MR. MARTIN: "Douching and genital talc use: Patterns of use and reliability of self-reported exposure."
MS. PARFITT: This was one of the articles that was put in the Dropbox on Monday, just so you're aware of it. We put it in the Dropbox.
THE WITNESS: No. But I reviewed it. Let me just go through -- give me one second.
MR. TISI: You want a copy?
MR. MARTIN: I have a copy of it or should.
THE WITNESS: I have it. I have it.
MR. MARTIN: Can you just mark this?
MR. TISI: Are you done with the review paper?
MR. MARTIN: I am.
MR. TISI: Thank you.

Page 104

(2023 article by Katie M. O'Brien, et al., Exhibit 13, marked)
Q. Can you look at the O'Brien 2023 article that was marked as Exhibit 13?
A. Sure.
Q. In particular, can you look at the end of the second body paragraph, the last sentence of that paragraph, "However, if historic use cannot be accurately recalled, measurement error can bias effect estimates, especially if recall reliability differs by outcome status."
A. Which page? I'm sorry. I missed it.
Q. It's the first page, page 376, of the journal pagination. But it's the first page of the article.
A. Where are we?
Q. It's the second paragraph of the body.
A. Okay.
Q. It's the final sentence beginning "However."
A. Yeah.
Q. Okay. That's talking about the concept of recall bias; right?
A. Uh-huh.
Q. And do you agree that recall bias can pose

Page 105

a problem in a retrospective epidemiological study?
A. That is correct.
Q. Okay. If you look at the next sentence, which is the beginning of the following paragraph, "Using data from the Sister Study, we examined patterns of use and reliability of recall for two feminine hygiene products thought to be associated with gynecological (verbatim) cancers." And the end of that sentence says "powder applied to the genital area" is one of those two. Do you see that?
A. Yes.
Q. Okay. We'll skip the part on douching and turn to page 383, which gets to some of the results about ovarian cancer. Let's look beginning with "The reliability," which is about the fourth line of the page.
A. Which page? I'm sorry.
MS. PARFITT: 383.
MR. MARTIN: 383.
MS. PARFITT: I'm sorry. Are you under "discussion"?
MR. MARTIN: No. I'm sorry. I'm in the paragraph that precedes "discussion."
THE WITNESS: Okay.
MS. PARFITT: How far down?

Page 106

MR. MARTIN: Four lines. Starts with "The reliability."
THE WITNESS: Yeah.
Q. "The reliability measures for genital talc use were similar for ovarian cancer compared to the full sample. However, while self-reported use in the 12 months before enrollment was more commonly reported on the enrollment questionnaire -- 27 percent -- relative to the fourth detailed follow-up questionnaire -- 21 percent -- in the full sample, the trend was reversed among those with intervening ovarian cancer diagnoses, with 28 percent self-reporting genital talc use at enrollment and 33 percent self-reporting genital talc use on the follow-up questionnaire." Let's unpack this a little bit.
For the full sample, it looks like self-reported talc use was higher at the beginning than it was in a later follow-up questionnaire, 27 to 21.
A. Give me a second to read.
Q. No problem.
A. There's so many different things here. Yeah. So self-reported use in the 12 months before enrollment was more commonly reported in the -- 27 to -- okay. Yeah. Got it.

Page 107

Q. So does that suggest that some women may have underreported their exposures in the later questionnaire?
MS. PARFITT: Objection. Form.
A. I'm not sure that's what it suggests.
Q. What else could it suggest?
A. Well, you know, there's -- is it the same sample? For example, if you look at the same -- paragraph down, I mean, half of the women diagnosed with ovarian cancer expired. So are we looking at the same sample? Before we can even interpret these numbers -- so if you had women with -- if you are losing the sample, I can't compare the estimates --
Q. Well, this is the full sample; right? It's not the sample limited to ovarian cancer-diagnosed women.
A. Yeah. But it is following -- it is the full sample. Then you have to get to the fourth questionnaire; right? You have to get to the fourth questionnaire. Between the enrollment and the fourth questionnaire -- that's what they're saying -- half of the women diagnosed -- so at least relevant to the ovarian cancer, I don't know how to interpret these numbers as being decreased reporting or increased reporting.

Page 108

I mean, it's probably not increased. But, you know, it's not the same sample that began and the same sample that reported at the end.
Q. Do you have any reason to believe that the people who dropped --
MS. PARFITT: No. Please. Go ahead.
Q. Do you have any reason to believe that the people who dropped out between the first and fourth questionnaire would be systematically as opposed to randomly different than the group as a whole?
A. I mean, we'll have to look at, you know, who are the dropouts; what are their characteristics; how much was the dropout. And we'll have to look at that.
And, you know, particularly if dropout is related to something with talc, such as ovarian cancer, then these estimates become, you know -- were people taking it, getting ovarian cancer, and then dropping out? I don't know.
Q. Let's look at the subgroup that does involve intervening ovarian cancer diagnoses, which is the second half of that sentence. "The trend was reversed among those with intervening ovarian cancer diagnoses, with 28 percent self-reporting genital talc in enrollment and 33 percent self-reporting

Page 109

genital talc use on the follow-up questionnaire."
So in that group that had an intervening ovarian cancer diagnosis, more people reported talc use after the diagnosis than before. Is that your understanding?
A. No.
Q. No, it's not?
A. I think you can't compare the samples. I mean, you know, they are comparing. That's fine. But to interpret these numbers, you'd have to know attrition, attrition by talc, and their characteristics. I can't really -- I can't affirm the conclusions that 28 increased with 33 is consistent.
Q. Let's look at what the authors of this article said about those numbers, and let me try to point you in the right direction.
A. Can you give me one minute to read this?
Q. Sure.
MS. PARFITT: Thank you.
Q. Happy to have you read it briefly on the record. If you're going to take a long time, I'd like to go off the record.
A. No. No.
MS. PARFITT: Finish. Are you done?

Page 110

A. One more. Yeah. Ask the question, if there's a question. I'll --
Q. Let's look at the next sentence. "This was the only subgroup for which the proportion of users increased between enrollment and follow-up and could indicate recall bias, i.e., over-reporting of talc use among those with a history of ovarian cancer." That's, I think, what we were talking about earlier. Do you disagree with that statement there?
A. Yeah. I mean, I don't think that that's what the results, you know, can be interpreted as. I mean, for example, if you go back to the methods, they say that, because the enrollment questionnaire did not collect information between age 14 and one year, it was impossible for a participant to report never use on the enrollment and ever use on follow-up without contradicting themselves.
Q. But in the full -- well, I'll put that aside. Let's look at the next column, the end of the first paragraph, "The observed increase."
MS. PARFITT: Page? I'm sorry.
MR. MARTIN: Again, page 383, the same page.
MS. PARFITT: I appreciate that.
A. The second column?

Page 111

Q. Second column beginning "The observed."
A. Beginning the -- which -- second paragraph?
Q. The first paragraph, the paragraph that carries over from the previous.
A. Yeah.
Q. "The observed increase."
A. Yeah.
Q. "The observed increase in self-reported genital talc use at follow-up relative to enrollment among ovarian cancer survivors may indicate recall bias is present and potentially driving some of the previously observed differences in effect estimates between studies collecting genital powder exposure status retrospectively versus prospectively."
A. It's interesting. That line is very interesting, I mean, because, A, you did not collect as they -- I'll restate it. They did not collect between 14 and one year before enrollment. So that's one.
And they're talking about ovarian cancer survivors. Well, what happens to women who get ovarian cancer? How many survive? So we have a highly lethal cancer. So the sample -- you know, you'd have to look at all people -- survivor, non-survivors -- to really make a judgment about

Page 112

recall bias here.
Q. Do you have a reason that the amount of recall bias would be different in the surviving group than the non-surviving group?
A. It could be. Yeah. I mean, without looking at the characteristics, you -- and, you know, I mean, it's not a small number as approximately half the women diagnosed with ovarian cancer expire.
Q. I just want to follow up. You said "it could be different." Do you have any bases here today for why it would be different?
MS. PARFITT: Objection. Asked and answered.
A. Yeah. I mean, you know, I don't -- I don't have that data because they don't provide the data on the women who expired and what are their characteristics.
Q. Even if you disagree with some of the conclusions drawn by the authors of this article, do you think the article is relevant to your supplemental report?
A. Yeah. So the question about relevance and the reason now I recall is -- I obviously included it in the list. And this is a discussion -- it does

Page 113

not provide direct data on talc and ovarian cancer. But it discusses recall bias in the Sister Study.
But there's no data on talc and ovarian cancer, per se, in this article, that it decreases ovarian cancer or increases. Either way, it does not refute. That's not the focus of this article. I mean, is there somewhere that I didn't miss?
Q. No.
A. Yeah. So it does not provide any -- as I outlined in the methods, I was looking at original data on talc and ovarian cancer.
Q. Is this article in your Appendix A under the excluded articles?
A. No. I don't think so.
Q. Okay.
A. Yeah.
Q. There a reason why it wasn't even in the excluded list in Appendix A?
A. Yeah. I don't recall -- I mean, there were so many references that, you know, I examined. So -- but, again, it does not provide the data on talc and ovarian cancer. But it's not that it's not -- you know, there's -- we discussed it and, you know, addressed as issues around recall bias.
Q. Generally, do you believe that everything

Page 114

responsive to your Scopus and PubMed search queries should be in Exhibit A?
A. Yeah. Yeah.
Q. Okay. You can put that aside. Is it standard practice in your experience for authors of scientific literature to disclose conflicts of interest if they're serving as a litigation expert?
A. Any kind of -- you know, either litigation expert or consulting for the company or doing something else. I mean, it's standard practice. Journals require it. It's not an optional thing.
Q. Have you published on talc and ovarian cancer --
A. No.
Q. -- since becoming an expert? If you were to do so, though, you would note your --
A. For sure.
Q. -- conflict of interest. Okay. And as a reader of scientific literature, is it something you consider important when you're evaluating a scientific study?
A. I mean, it is a factor among other factors, bias. I mean, the predominant factor is methodology. I mean, that is the driving factor. But, yes, bias --funding bias, you know, whether

Page 115

it's manufacturer, whether it's expert witnesses or testimony, consultants.
It is a factor. And the way it is a factor is interpretation, you know. One has to rely that the findings in the peer-reviewed literature, at least to the extent that they've been undergoing peer review, are, you know, rigorous. And, you know, obviously one has to examine the methods. But disclosure is important.
Q. Is there a way -- did you perform -- did you quantitatively weigh the importance of the studies included in your 2023 expert report?
A. No.
Q. Okay. Is there a way we could tell from reviewing your report whether one study was more important than another in the formation of your opinion?
A. I mean, you'd have to look at the description about strength and limitations. But, again, that's not a numerical value.
Q. Is the fact that an author is --
MR. MARTIN: Can we take a break here? Go off the record.
(A break was taken)
MR. MARTIN: Back on the record.

Page 116

Q. When you were performing your qualitative evaluation of the studies in your expert report, did you consider whether an article author was a paid litigation expert?
MS. PARFITT: Objection. Form.
A. I mean --
MS. PARFITT: Please answer.
A. Yeah. I mean, I considered it. But, again, I think I answered the question -- is that the primary consideration was, A, what is the methodology they're talking about? What are the issues at stake? And, you know, obviously whether they are experts is a consideration.
Q. All else being equal, would you have fewer bias concerns with a paper published by a neutral author than by a defense expert?
MS. PARFITT: Objection.
A. I mean, I think that, to me -- I hate to say it -- but in this realm, I mean, there have been so many papers published by defense experts as well as, you know, some papers by experts in plaintiffs that if one were to start excluding all those, then, you know, the body of literature would be, like -- why -- you have to -- I mean, if it comes up peer-reviewed literature, I have to evaluate.

Page 117

And if the methodology is sound, then, you know, you have to acknowledge that yes, they are. And -- but you have to go by the methodology really.
Q. So it is something you acknowledge?
MS. PARFITT: Objection. Form.
A. Yeah. I mean, I may not have stated it explicitly. But that is important to acknowledge.
MR. MARTIN: Let's break for lunch. Off the record.
(A break was taken)
MR. MARTIN: Back on the record. So let's mark as Exhibit 14 Gabriel 2019, "Douching, talc use, and risk for ovarian cancer."
(2019 article by Iwona M. Gabriel, et al., Exhibit 14, marked)
Q. You've seen this document before; right?
A. Yes.
Q. You cite it in your 2023 report; right?
A. That is correct.
Q. And this is a case control study from 2019; right?
A. That's correct.
Q. And it's the same data that were previously reported in Cramer 2016?
A. I'm not sure entirely. I mean, I didn't

Page 118

duplicate, you know -- this was a new study, provided data on association between talc and ovarian cancer. Yeah. But it did include, you know, the eastern Massachusetts and New Hampshire cohort, you know -- cohort.

Q. If you look at 1835, which is the first page, under "materials and methods," you'll see "Details regarding enrollment are described elsewhere." Then it's Reference 10. Then Reference 10 is to the Cramer 2016 article. Do you see that?

A. Yes.

Q. Okay. In fact, Dr. Cramer is also a co-author on this article; right?

A. Yes.

Q. Okay. We talked a little bit before lunch about litigation conflicts. So let's check the second-to-last page, "Disclosure of potential conflicts of interest." Do you see that? 1843.

A. Uh-huh.

Q. "A.F. Vitonis has provided statistical programming to support expert testimony for Beasley Allen law firm. D.W. Cramer has provided expert testimony for Beasley Allen law firm." Does this say what the subject of Dr. Cramer's expert

Page 119

testimony was?

A. No.

Q. Does it say who Beasley Allen represented?

A. No.

Q. Okay. You're aware that Dr. Cramer is a plaintiffs' expert in talc litigation; right?

A. I'm not sure he is, but he was at some point.

Q. I'm sorry. Yes. You're aware that he was.

A. Yeah. At some point in time.

Q. Would the fact that the litigation referenced in the conflicts of interest disclosure involved talc be something that would be relevant to you as a reader?

MS. PARFITT: Objection. Form.

A. Can you restate the question?

Q. Sure. Do you understand this testimony that Dr. Cramer provided for Beasley Allen to be related to talc?

A. Yes.

Q. Okay. Do you think that a reader who is not involved in the litigation would understand that?

MS. PARFITT: Objection as to what another reader would understand or not.

Page 120

MR. MARTIN: Understood.

A. I mean, they would go through -- if they went through Beasley Allen, yes, they could. But I don't -- I can't put myself in their situation.

Q. Okay. You'd agree it doesn't explicitly say that.

A. Exactly.

Q. Is the fact that it involves talc something that would be relevant for you to know?

MS. PARFITT: Objection. Form.

A. Right. For me, it doesn't because -- so when I look at articles and the disclosure, when I look at a disclosure section, I'm assuming that disclosure is relevant. That's why they're making the disclosure. I mean, it's either funding or -- you know, it's NIH, NCI, we do disclose. FDA, I disclose. And/or if it's expert testimony, then it's relevant to the subject matter at hand. But, obviously, it's not explicit here.

Q. Would you as a reader want to know whether he consulted for defendants or plaintiffs?

MS. PARFITT: Objection. Form.

A. I can't tell the reader -- I mean, I know and, you know -- potential reader would want to know, yes, I mean.

Page 121

MS. PARFITT: Objection to "potential reader would want to know."

Q. Did you consider Dr. Cramer and Dr. Vitonis's conflict of interest when you were evaluating this paper for your expert report?

A. As I stated earlier, I think my answer to that question will be sort of consistent, and, you know, I -- I'm aware of it. But, you know, it's the methodological issues.

This is a supplemental report of -- what -- 17, 20 pages. I'm aware of those conflicts, and I consider it. But I don't think that was the major consideration. It's the methodologic issues. The fact they provided new data and the fact that they reported an increased risk, those are the considerations.

Q. You don't note that fact in your report?

A. No, I don't.

Q. You'd agree with me?

A. But I did consider it.

Q. Can we turn to the next page, 1844, "Acknowledgments," second column, "The costs of publication of this article were defrayed in part by the payment of page charges. The article must, therefore, be hereby marked 'advertisement' in

Page 122

accordance with 18 USC, Section 1734 solely to indicate this fact." Did you notice this disclaimer when you initially read the Gabriel article?
A. Yeah. I mean, I focused on the acknowledgments, and I focused on the disclosure. I did not notice that in the disclaimer as an advertisement.
Q. Have you seen a disclaimer like that in the scientific literature before?
A. I mean, I've not gone and looked for it, but.
Q. So the answer to the question is "no"?
A. No.
Q. Okay. Let's --
MS. PARFITT: I object to that. Misstates what he said. He said he's not looked for it.
A. To clarify that -- since we are on the topic -- to the disclaimer part, yes, the cost of publication was defrayed. I mean, we also put it. But the second part, you know, I have not seen.
Q. Understood. So it's the second sentence --
A. About advertisement.
Q. Okay.
A. But the costs, yes, we -- in fact, my

Page 123

recent article has that.
Q. Can you look at Table 1 in the body of the report, which is on page 1837? Towards the bottom, you can look at "tubal ligation." Just tell me when you've gotten there.
A. Yes.
Q. Okay. So you look at the cases -- which would be the women with ovarian cancer; correct?
A. Uh-huh.
Q. Okay.
A. Yes. Yes.
Q. And you see that 30.7 percent of them -- looking at the women -- I'm sorry. Looking at the women who have not undergone tubal ligation, you see that 30.7 percent of the cases had used genital talc.
A. Yes.
Q. And 26.2 percent of the controls?
A. Yes.
Q. And that would be consistent with what you'd expect if talc were associated with a slight increase in risk; correct?
MS. PARFITT: Objection. Form.
A. Let me just get back to the numbers. Give me a second.

Page 124

Q. Can I refocus the question?
A. Sure.
Q. The fact that slightly more cases than controls had reported exposure to genital talc would be consistent with an increase in risk; correct?
A. Yes.
Q. Okay. Let's look at the next row, women who have had a tubal ligation. Okay?
A. Yes.
Q. 36.5 percent of cases and 26 percent of controls reported using genital talc; correct?
A. Yes.
Q. Okay. You'd agree with me that's a larger difference than the difference for women who reported tubal ligation?
A. Yeah. But the overall numbers are so small. I mean, if you look at the sample size, we are talking about 541 cases versus 440 controls and then 101 versus, you know, 310. So it's -- sorry --
Q. Okay.
MS. PARFITT: Let him finish.
MR. MARTIN: I'll let you finish.
A. 101 versus 310, those are not comparable. But the magnitude of the difference is higher.
Q. Okay. How do you explain the fact the

Page 125

magnitude of the difference is higher among women who have had a tubal ligation than among women who have intact genital tracts?
A. I mean, their primary analysis focused on, you know, reporting risks based on adjustment factors and the reported increased risk. It is entirely plausible that it is even increased in those who have tubal ligation. So that, you know -- it's not that those findings are incompatible with biological plausibility.
Q. I guess I'm asking why the difference in risk would be larger among women with tubal ligation than among women without.
A. First of all, none of the tests that -- if you look at the -- if you're looking at the -- the difference is not -- is not -- I would say 30.7, 26.2 -- and, you know, tests for interactions there are not significant. So I don't see that as being any materially different.
Q. So do you think it's just maybe statistical noise?
A. Could be statistical noise.
Q. Okay.
A. I mean, not noise. I would say, I mean, it is a finding. So you have to go by what they

Page 126

reported. But it is entirely plausible that women who had tubal ligation also had an increase. The magnitude of -- I think the magnitude of risk is sort of not a relevant -- very relevant consideration right here.

Q. You mentioned that the -- strike that.

You'd agree that the authors of Gabriel 2019 did not calculate separate odds ratios for women with intact tubes and women without?

A. They adjusted for it.

Q. Correct. But they did not calculate separate ratios.

A. No.

Q. Okay. So we talked about this involving some of the same cases and controls as Cramer. So I do want to look at the Cramer study, Cramer 2016.

MS. PARFITT: I will just note that, on pages 194 all the way through, there's a significant discussion of the Cramer 2016 article in the first deposition in 2019.

MR. MARTIN: I am aware it was discussed in the first deposition. I will keep this very short. I want to talk about specifically one sentence that is in the 2023 expert report.

MS. PARFITT: Very good. I appreciate

Page 127

that. Thank you.

(2016 article by Daniel W. Cramer, et al., Exhibit 15, marked)

MR. TISI: Remind me the exhibit. I apologize.

MR. MARTIN: 15.

MR. TISI: Thank you.

A. Which page?

Q. Let's look at 12, page 12 of your supplemental expert report.

A. Yes.

Q. In that list of bullets, it's the fourth bullet --

A. Yeah.

Q. -- "Cramer, et al. included an 18 percent buffer to account for recall bias before nullifying their study results." When you say "included an 18 percent buffer," do you mean -- well, what do you mean by that?

A. Yeah. So they have a "discussion" section where they talk about -- let's go to the "discussion" section. Starting from 341, addressing recall bias, we conducted sensitivity of the analysis, and then the odds ratio of 133 -- 1.33 would be nullified if the sensitivity of correctly

Page 128

classified controls fell to 82 percent or 18 percent.

Q. I guess my question is about your understanding of the term "nullified." Does it mean the risk ratio would be 1.0, or does it mean the risk ratio would be statistically insignificant? Or does it mean something else?

A. I mean, it means an odds ratio would be statistically insignificant.

Q. But it could still be elevated over 1.0?

MS. PARFITT: Objection. Form.

A. Let me just --

Q. I'll strike the question.

So let's look at the portion of Cramer that you just quoted, which is beginning on page 341, the final paragraph.

A. 341. Yes.

Q. Okay. "Addressing recall bias, we conducted a sensitivity analysis that assumed truly nonexposed cases and controls were accurately classified as unexposed, i.e., specificity 99 percent."

Do you know whether that assumption, that all truly nonexposed cases were correctly classified, is a realistic one?

Page 129

MS. PARFITT: Objection. Form.

A. Yeah. I mean, it is to the extent that why would nonexposed people recall talc exposure. It is a reasonable assumption.

Q. Okay. Do you know if it's empirically realistic?

MS. PARFITT: Objection. Form.

A. I don't understand that word. My English is poor. What is "empirically realistic"? Is it reasonable, unreasonable?

Q. Do you know if there are any data on the reliability of recall?

A. Yeah. We were looking at that data, and we just looked at Exhibit 13. And they said, you know --

MS. PARFITT: Could you identify the article? O'Brien?

A. O'Brien. And they said classification of ever use of feminine genital products may be recalled with good -- I mean, I don't know the numbers there, but they can recall with good consistence. I have no reason to suspect that the assumption that Dr. Cramer makes is suspect.

MS. PARFITT: Dr. Singh, if I can just ask one thing -- and Mr. Martin. For the court

Page 130

reporter, when you start talking fast when you're reading an article, she may not catch the words you're reading from the article.

MR. MARTIN: Please, if anyone is talking too quickly and you're not getting it down, please let me know.

Q. Well, let's look at the next clause in the Cramer article.

A. Sure.

Q. The next assumption that Dr. Cramer makes is "Truly exposed cases were also correctly classified, sensitivity 99 percent." Do you assume -- do you know whether that's a realistic assumption?

MS. PARFITT: Objection. Form.

A. I mean, I don't see data elsewhere to support that it is otherwise.

Q. Okay.

A. I mean, you know, it -- 99 percent, 98 percent, I don't see data elsewhere.

Q. So you don't know one way or another?

A. Yeah. I mean, that's an assumption. And, you know, it's a reasonable assumption.

Q. Okay. Next sentence, "The OR of 1.33 in our study would be nullified if the sensitivity of

Page 131

correctly classified controls fell to 82 percent or 18 percent misclassification." That's what you're basing your 18 percent buffer on?

A. Exactly.

Q. Okay. Do you know if 18 percent is a reasonable estimate of misclassification?

A. I think they cite, you know -- they go to other studies of -- at that time at least. You know, they go to other studies and say "Well, let's look at, you know, assumptions about control classification."

And I think they have it about -- they talk about they found an age-adjusted OR for breast cancer -- just below that line -- of 1.42 associated with 30 or more grams from the prospective data compared to 1.33.

So I think, they're using that, this change would occur if the sensitivity of controls correctly used drop to 1 percent or 9 percent; this suggests some degree of misclassification but not as great as 80 percent required to nullify.

Q. That section that you just read is about the relationship between breast cancer and alcohol?

A. Yes.

Q. Okay.

Page 132

A. A lifestyle variable and cancer.

Q. But to be clear, it's about alcohol, not about cosmetic use.

A. That is correct.

Q. Okay. And to go in between where you read and I read, the sentence starting with "Unfortunately," "Unfortunately, there are no external records to validate talc use reported by study participants to assess whether this degree of misclassification is reasonable." Are you aware of any external records that -- any such external records?

MS. PARFITT: Used by the investigators in this study?

MR. MARTIN: No.

Q. Are you aware of any such external records that have come into existence since 2016?

MS. PARFITT: Objection.

A. Well, yeah. I mean, we discussed the Sister Study that, you know, assessed. But it doesn't assess whether this degree of --

Q. Okay.

A. I mean, I saw the other Goodman study, which talks about different misclassifications. But I'm not sure that, you know -- we can discuss it --

Page 133

whether that's reasonable. It has two, you know --

Q. You can probably conduct this deposition by yourself because that's what I want to get at right now.

MR. MARTIN: If we can mark Goodman 2024.

(2024 article by Julie E. Goodman, et al., Exhibit 16, marked)

Q. All right. So I have had marked as Exhibit 16 Julie Goodman, et al., "Quantitative recall bias analysis of the talc and ovarian cancer association." This study was published in 2024.

So I assume -- well, so it was not, obviously, in your expert report. But it was produced to us on Monday by your lawyers or by plaintiffs' lawyers. You've -- you're familiar with this article?

A. Yes. I have had a chance to read it.

Q. And one of the things that -- well, the thing this article does is to evaluate the possible effects of recall bias on the Cramer study we just looked at. Right?

A. Sure.

Q. If you can turn to page 2 -- and I'll try to get there. If you could look at the second

Page 134

column of page 2 beginning "Of these studies." And if you can read down there for the next two paragraphs, and I'll ask you some questions about it.

A. Which one? The second column?

Q. Second column, the first two paragraphs of the second column.

A. "In the published case control studies on talc"?

Q. Yes. Correct.

A. Okay. Of these studies, only Cramer conducted a recall bias and so did (verbatim) using point estimates of sensitivities and specificity rather than distribution. The investigators recalculated the ORs assuming 99 percent recall in cases and 99 -- and 82 percent recall specificity and sensitivity in controls using the assumptions the OR was 1.

Q. Would you agree with me that what the authors are saying here is that, using different assumptions than Dr. Cramer, that they produced further attenuated results?

A. I haven't even read that. Yeah. But in this analysis -- but I have my, you know -- since I reviewed it and it came out in '24, I have my

Page 135

opinions on it.

Q. So let me ask you. How does this paper affect your opinions of Cramer 2016?

A. Yeah. I will provide those opinions. First of all, you know, I reviewed it. There are several considerations in this paper. So the question is, when they are doing these recall bias analysis, where are they getting the numbers from? They're getting it from the Sister Study, sensitivity, spes -- that's one. And we discussed the issues with that.

Then they are quite explicit that all their Analysis D, Scenario 3, Scenario 4, Scenario 5 are -- none of them adjust for any confounders. So this is all unadjusted analysis. So, again, if confounding is an issue in case control studies, I don't know what weight to put on the analysis when they are all unadjusted.

Q. Do you know whether adjustment for confounding would increase or decrease the association?

A. I don't know here. You know, I don't know. So they state that these are unadjusted. And perhaps, even more importantly, the method that they use is known as a triangular distribution. We chose

Page 136

a triangular distribution. In the first column in that page, they talk about a triangular distribution because it is an ideal distribution where the only data on hand are the maximal, minimal values and the most likely outcome.

That is not entirely correct. You have maximal and minimal. But you also have median or mode. And in this case, you know, if you use a triangular distribution versus other distributions like port (verbatim) or others, triangular distributions give weights to the tails. So that's why their confidence was wider.

Other ways to analyze this data using other distributions would give much more curve than -- give weight to the shoulders. So I don't agree with their analysis.

Q. You said it would give different confidence intervals. Would it give a different point estimate?

A. Yes. Yeah. I mean, the shapes are different.

Q. Okay. Let's move on to the next exhibit, which is O'Brien 2020.

MR. MARTIN: Actually, before we do that, can we look at the Cramer study one more time?

Page 137

MS. PARFITT: Cramer '16?

THE WITNESS: Which is what number?

MS. PARFITT: 15. It's No. 15.

Q. Can we look at Table 2?

A. Yes.

Q. Do you see that they -- in this case, they separately calculated odds ratios for hysterectomy, for intact or nonintact genital tracts?

A. Yes.

Q. Okay. And do you see that the point estimate for women who have had hysterectomy or tubal ligation is higher than the point estimate for women who have not?

MS. PARFITT: I'm going to object. This specific exact question was asked on page 196 of his 2019 deposition, I mean, down to the page number, carrying over from the bottom of page 337 over to 338.

And the question was about tubal ligation and hysterectomy. The question was about the protective or lack thereof nature of those diseases -- of that process.

MR. MARTIN: Can we go off the record for a moment?

MS. PARFITT: Yes.

Page 138

(A break was taken)
MR. MARTIN: Back on the record. Let's move on to O'Brien 2020, which postdates your most recent deposition and report, and which we can mark as Exhibit 17.
(2020 article by Katie M. O'Brien, et al., Exhibit 17, marked)
A. Do you have the supplement tables for this?
Q. Not in this document. I believe I have them elsewhere.
A. Can I use my copy of supplements?
Q. Sure.
MS. PARFITT: Yes.
MR. MARTIN: Yes. So this --
MS. PARFITT: Give him one second here. Okay. Good. Thank you.
Q. We talked about Dr. O'Brien and Dr. Wentzensen earlier. You agree that they're well-regarded?
A. I don't know if they are well-regarded. We talked about that they worked for, you know, NIEHS. Yeah. I have nothing against scientists, you know, whether -- Dr. Cramer is well-regarded too. He's done tons of studies on ovarian cancer.
Q. This article was published in JAMA. Are

Page 139

you familiar with that journal?
A. I've published in it. So I'm quite familiar with it as you can see in my --
Q. And I hope you would agree with me it's a prestigious journal.
A. Yes, it is.
Q. You've published in it, you said.
A. Yes. Many times.
Q. Do you read it?
A. Yeah. I read it every week.
Q. Would you agree with me that none of the authors here, to your knowledge, are experts on either side of this litigation?
A. No. They're government -- I mean, as far as I'm aware, they are, you know, employees --
MS. PARFITT: I didn't get to interpose an objection. I'm going to object. You may certainly answer.
A. I'm not aware of their involvement. That's all.
Q. Okay.
MS. PARFITT: Zack, I'm not being difficult. I just don't know who you all are going to be submitting in May. Many of these people could show up.

Page 140

MR. MARTIN: Understood.
Q. Can you look at the first sentence of the "results" section in the abstract on the first page. What's the sample size for this study in terms of number of women?
A. 252, 745.
Q. Okay. And it talks about something called "person years." You understand that to be -- well, what do you understand person years to be?
A. Yeah. It's exposure time, you know, follow-up during that study period.
Q. What is the number of person years at issue in this study?
A. 3.8 million.
Q. Okay. Can we turn to Table 2, which is on page 53?
A. Sure.
MS. PARFITT: Just to be clear, not the supplemental table but --
MR. MARTIN: Correct. On page 53 of the primary article.
MS. PARFITT: I'm sorry about that. I'm sorry. Okay.
Q. At the bottom of the first half of this table, they have a pooled estimate for all women.

Page 141

Do you see that?
A. That is correct.
Q. What's the confidence interval on that pooled estimate?
A. .99 to 1.17.
Q. Would you agree with me that, as traditionally understood, that is not statistically significant?
MS. PARFITT: Objection. Misstates the evidence and his testimony.
A. Well, Dr. O'Brien herself in subsequent interpretations has concluded that there's a positive association between talc and ovarian cancer without any qualifications about patent or nonpatent tubes.
Q. If you could just focus on the question I asked --
A. Sure.
Q. -- which is would you agree that a confidence interval that crosses 1 at a 95 percent value is not, as traditionally understood, statistically significant?
MS. PARFITT: Objection. Completely misstates the state of science and his expert opinions.

Page 142

A. Yeah. Can you repeat it? I'm sorry. I'm trying to understand and answer.
Q. What do you understand -- you'd agree this confidence interval -- this 95 percent confidence interval crosses 1.0.
A. That is correct.
Q. Okay. You'd also agree that all of the -- in each -- the confidence interval for each of the individual cohorts crosses 1.0.
A. That is correct.
Q. Okay. You'd also agree that, for one of the individual cohorts, the point estimate is below 1.0.
A. We should discuss that cohort because the median follow-up time in that is 3.8 years, which is not etiologically relevant for ovarian cancer. We discussed person years. But we have 2168 with ovarian cancer, where in the case control we have 15,000. So, yes, we should look at that. But we also need to look at where are those numbers coming from.
Q. Dr. Singh, I appreciate that you need to give context. I'd appreciate it if you could focus on the answer to my question because we have limited time.

Page 143

A. Right. I have to give context. I cannot answer questions without context.
Q. Would the limited follow-up explain why the point estimate is below 1.0?
A. Yes.
Q. How so?
A. Because they would not have sufficient number of cases. You know, we -- they don't have etiologically relevant exposure periods. You know, three years of follow-up to really detect ovarian cancer?
I mean, I don't think -- in my analysis, this study should not have been -- you know, is not really informative on the association. And, actually, if you look at the ones that you were pointing out -- the pooled hazard ratios -- the confidence intervals for that are so wide that it's just contributing very little information and weight to the analysis.
These results that you see here, they are driven by the NHS and WHI-OS. I can examine the confidence, then tell you. The NHSII and VI are not driving any of these results.
Q. The study with a 3.8-year follow-up is the NHSII?

Page 144

A. That is correct.
Q. That study is not driving the pooled estimate?
A. That is correct.
Q. Can we turn to page 3 on Table 55? Looking at the top of Table 3, you can see that the authors here looked at different levels of use.
A. Yeah. They looked at, you know, frequency and duration of use.
Q. Okay. Looking at long-term use for the "all women" group, can you tell me what the adjusted hazard ratio and confidence interval is?
A. Yeah. I'll provide that and also provide what they mean by "long-term use." So the hazard ratio -- adjusted hazard ratio, if I'm correct, is 1.01, .82 to 1.25. So, again, NHS has no data on long-term use.
The only three studies that provide data on long-term use are -- NHSII, VI, and WHI-OS define very differently. "Long-term use" is defined in NHSII as at least weekly for 20 years. In the Sister Study, "long-term use" is defined as perineal use at ages 10 to 13 and in the last 12 months.
And in the WHI study, "long-term use" is defined as 20 or more years for any of the three

Page 145

questions. So what is long-term use?
Q. Two of the three studies you mentioned defined it as 20 or more years.
A. Yeah. But they ask different sets of questions. One of them even asked questions about -- if you look at the Sister Study questionnaire, it asks about, during the ages of 10 to 13, how often did you apply. And the options were "sometimes," "frequently," "don't know." And then they had a second about in the past 12 months.
In fact, they are incorrect in their exposure classification because they say "more than five times per month." If you look at Chang and the original Sister Study, it was more than five times per week, if I'm correct.
Q. The question was not about frequency. It was about length of use. There is a frequency number later, but let's focus on the length of use number now.
A. Sure.
Q. Point estimate is 1.01. Do you believe that shows an association?
A. I just don't -- I believe that analysis of long-term use is flawed because of the way long-term use data was collected. And I mean, for example,

Page 146

let's look at Sister. Long-term use, perineal use at age 10 to 13 years, last 12 months. What happened to that whole --

Q. You've made your opinion clear. I'm simply asking whether you believe a 1.01 hazard ratio represents an association.

A. Not in this context.

Q. Okay. Thank you. You'd agree that the 1.01 point estimate here is lower than the point estimate for all users that we discussed earlier.

MS. PARFITT: Objection to form.

A. Which was one -- which one? The overall?

Q. The overall.

A. Yeah. It would be. I mean, you know, you're selecting a subsample. You have wider confidence intervals. You've lost a study already, which didn't collect data, which was, you know, a study that was driving the estimates. So I don't see it as any -- I think it's more about how exposure was defined and measured and --

Q. Let's look at talc use for greater than one week. What's the pooled estimate and confidence interval there?

MS. PARFITT: I'm sorry. Where are you?

MR. MARTIN: I apologize. That's the

Page 147

end of the first half of Table 3.

A. Yeah. 1.09, .97 to 1.23.

Q. Let's look at the bottom half of the table, which is women with patent reproductive tracts.

A. Sure.

Q. Again, let's look at long-term use. What is the adjusted hazard ratio there?

A. 1.

Q. Okay.

A. .76 to 1.32.

Q. So there's no association reported there; correct?

MS. PARFITT: Objection. Form.

A. Yeah. But the frequent users report an association 1.19, 1.03 to 1.37.

Q. Correct. But the long-term users, there's no association reported.

A. Yeah.

MS. PARFITT: Objection.

Q. That's a lower point estimate, again, than the long-term users -- than "all women" long-term users?

A. I mean, I think we are talking about dose, you know. We have to talk about what is an appropriate measure of dose. It is, you know --

Page 148

total number of applications is probably the best number.

And we know from several studies -- Penninkilampi, others -- that total number is a better measure. Forget about the results. What is a better measure? You can't separate use and frequency. I mean, they have it. And even that, they have mis-specified in how they have measured it.

Q. Again, if you could just answer the questions that I'm asking. Ms. Parfitt will have an opportunity to ask you questions if you want to clarify anything later.

You would agree that the long-term use point estimate is lower among women with patent reproductive tracts.

MS. PARFITT: Objection. Asked and answered.

A. How is that lower? Is it 1.01 and 1?

Q. Yes.

A. I don't think that makes any material difference, I mean.

Q. Okay. So Dr. O'Brien and colleagues did not initially look at only medically confirmed cases; is that correct?

Page 149

A. Yeah. Show me the section. I have vague recollection, but you have to point me out where.

Q. Well, I'll point you to Table 4, which is on the next page, which is a subset of medically confirmed cases. Do you see that?

A. Yes.

Q. Okay. Let's look at all medically confirmed cases, ever use, top left column. What's the hazard ratio there?

A. Hazard ratio -- I mean, if you want to just have me read things, yes, it is 1.05, .96 to 1.16.

Q. Would you agree that -- do you believe a 1.05, 0.96 to 1.16 confidence interval demonstrates an association?

MS. PARFITT: Objection. Asked and answered.

A. Depends on the context. You know, we have many associations, that, you know, maybe 5 percent is a protective effect, you know, diets, fruits, vegetables, you know, and even a 10 percent increased risk is -- so it really depends on the context of, you know, and what else do we know about that.

Q. So a few moments ago, you said you didn't think there was a material difference between 1.01

Page 150

and 1.0.
A. Yeah.
Q. There may be a material difference between 1.05 and 1.0. How do I know where you draw the line here?
MS. PARFITT: Objection. Misstates the testimony.
A. I'm not parsing out 1 and 2 and 3. I mean, that's not what I'm saying. I'm saying that to the -- in terms of a material difference, it is, like, what is the question you're trying to answer right there. And remember, there are different set of adjustments. So the sample size has changed. Obviously, the point estimates will change.
Q. Okay.
A. Exposure metrics have changed. You have "ever," "long-term," "frequent."
Q. But you would agree with me that the hazard ratio among medically confirmed cases was attenuated from the 1.09 we talked about earlier.
A. Yeah. Because --
MS. PARFITT: Objection.
A. -- the numbers of cases declined. Number of cases declined. So it went from already low, 2,168, to now even lower, 1800 cases. Of course,

Page 151

you know, these could be attenuated.
Q. Why would a smaller number of cases reduce the hazard ratio?
A. Because of power.
Q. Okay. Power would increase the size of the confidence interval?
A. And can lower the point estimates because you are unable to detect an association. Either way.
Q. Okay. Could it also raise the point estimate?
A. Lower power?
Q. Yes.
A. How would it raise the point estimate?
Q. Is your testimony that it is impossible for lower power to raise the point estimate?
MS. PARFITT: Objection. Asked and answered.
A. If a study is statistically under power, what it does, it gives you a more imprecise confidence interval.
Q. Let's look at the "discussion" section. Let's look at page 58.
A. The reference?
Q. This is the last paragraph before

Page 152

"limitations," so "The strengths of this study."
A. That's 57.
Q. You're correct, and I'm wrong. Thank you. Do you see where I intend to be?
A. Yes.
Q. Okay. "The strengths of the study were long" -- excuse me -- "large sample size and long follow-up time." Do you agree that those are strengths of the study?
A. I think as compared to the previous cohort studies, yes, but not sufficient enough to detect cancer like ovarian cancer related to talc. Yes, compared to the initial cohorts, they have increased the sample size.
Q. Did you mention that in your expert report?
A. I don't recall what I mentioned. But, yeah, I mean, I did talk about their -- I'll have to go and look at it.
Q. Okay.
A. Give me one second. I did not mention that specific strength. But I also mentioned that strengths are noted, they're less prone to recall and recall bias remains a concern. But I did not mention that specific strength.
Q. Okay. Would you agree with me that one of

Page 153

your criticisms of the cohort studies that preceded O'Brien was insufficient statistical power?
A. That is correct.
Q. And another criticism was insufficient follow-up time.
A. That is correct.
Q. Okay. Let's look at page 50 of O'Brien.
A. 58?
Q. 50. I apologize.
MS. PARFITT: Let us know if you need to take a break. Not in the middle of a question, though.
Q. Do you see the last paragraph of the introduction -- last sentence of the introduction?
A. Yeah.
Q. "Incorporate additional data, including additional cases and longer follow-up time."
A. Yes.
Q. Do you know how many years of follow-up time were added for each of the underlying cohorts in the O'Brien 2020 data?
A. I mean, not specifically. But I think Table 1 provides that, you know.
Q. Yeah.
A. If we can go there and talk about it.

Page 154

MR. MARTIN: Can we take a break and then go there and talk about it? Off the record.
(A break was taken)
MR. MARTIN: Let's go back on the record and mark a new exhibit, which is your 2018 expert report.
(2018 report of Sonal Singh, M.D., M.P.H., Exhibit 18, marked)
A. Back with O'Brien later?
Q. We're going to go back and forth. So if you can keep O'Brien up, that would be great.
A. Sure.
MR. TISI: You mean old report, new report or --
MR. MARTIN: Potentially all three. I'm sorry the table is so small.
MR. TISI: No. It's okay. You had nothing to do with the table. I just wanted to make sure --
MR. MARTIN: I did not, no.
Q. Look at page 49 of your 2018 report.
A. Yeah.
Q. So this is the Women's Health Initiative study reported in Houghton. Do you see where you noted that the study had only 429 ovarian cancer

Page 155

cases?
A. Yes.
Q. Do you see at the beginning of the second paragraph on page 50 where you noted it as 12 -- there were 12.4 mean years of follow-up?
A. Where is that? I'm sorry.
Q. The beginning of the first paragraph on page 50 of your 2018 report.
A. Okay. 50. Right?
Q. 50.
A. Yeah.
Q. Okay. So let's compare that to the nurses -- excuse me -- the Women's Health Initiative study in O'Brien Table 1.
A. Sure.
Q. Now, 659 cases and 17.4 average years of follow-up. Do you see that?
A. That is correct.
Q. Okay. So substantially more on both -- substantially more cases and longer follow-up.
A. Yes. The number of cases has increased. Follow-up has increased. But there is, you know, obviously -- if you only look at the Women's Health Initiatives, that's true.
But NHS is, you know -- NHSII has very

Page 156

limited follow-up. And then even for WHI, if you look at the footnote to that table, they say that pool's baseline oophorectomies were not recorded.
So we don't know what happened to women who got an oophorectomy after exposure and developed ovarian cancer so -- because they were not collecting data on ovarian cancer -- oophorectomy.
Q. They were collecting data on ovarian cancer.
A. Yeah. But some of these oophorectomies could be due to ovarian cancer. That is the same case with NHSII.
Q. Okay.
A. Because data were reported in two-year cycles, we did not sense for oophorectomy that occurred after 2013, whereas NHS and Sister did sense it.
Q. So let's talk about NHSII. That's entirely new data reported for the first time in O'Brien.
A. Yes.
Q. Okay. And then NHSI, which you talked about in your initial report on pages 47 and 48 --
A. Yes.
Q. Okay. Initially, there were 307 cases of ovarian cancer.

Page 157

A. Yeah.
Q. And now there are 1,258.
A. That is correct.
Q. So about -- more than triple -- more than quadruple, actually.
A. Yeah. That is correct. But we have to examine that. The analysis in that study, 2000, page 47 -- if you go to page 48, they report there was an increase -- all the analyses adjusted for tubal ligation. Now here, we have analysis which interact by, you know, age adjusted for -- after adjusting for co-variants.
So tubal ligation, if you look at page 40 in the first line, tubal ligation and parity were confounders in that analysis.
MR. MARTIN: Let's go off the record. There's a knock at the door.
(A break was taken)
MR. MARTIN: Back on the record.
Q. I believe I asked you about the increased sample size in the Nurses' Health Study reported in O'Brien. And you agreed that it was more than quadruple the size of the initial Nurses' Health Study in terms of cases.
A. Yes. And I also pointed out the specific

Page 158

issue that the first Nurses' Health Study adjusted for the confounder of tubal ligation, whereas here, now they have started to look at -- in fact, all the three studies -- Sister and WHI also -- adjusted it as a confounder. So now, you know, there's a separate analysis. So it's something to note, that when we are looking at these numbers, what are the implications of that.

Q. Those numbers wouldn't -- the -- I'm trying to get at the power of the study. Whether it adjusted for tubal ligation would not address the power of the study, would it?

MS. PARFITT: Objection.

A. It would. It would. Because -- why? Because power also depends on confounders. Right? Power is -- you're talking about unadjusted power versus adjusted power. Powers is -- numbers is one issue. But what are the other issues?

You know, we've talked about confounding and recall bias. So power is just you -- obviously -- number is one issue. The other is etiologic follow-up time. For example, NHSII, you add this to million-year follow-up time. I'm not sure any of it has etiologic relevance. 3 .8 years of follow-up, you present that to an ovarian cancer researcher and

Page 159

-- it's not relevant. So it's not just the years. It's -- the question is what is relevant years?

And I said, you know, NHS and WHI are informative. NHSII is really not informative. I'm not even sure why one would include a study of limited follow-up in the same analysis.

Q. You mentioned earlier that you thought NHSII was not a major contributor to the pooled estimate.

A. Yes.

Q. Okay.

A. It isn't.

Q. Okay. Did you note the increased follow-up time in these studies anywhere in your 2023 report?

A. Let me take a look. Please give me one second.

MS. PARFITT: Can I direct him to pages?

MR. MARTIN: Yes.

MS. PARFITT: Page 16, you're talking about your cohort studies, Doctor, if that helps you, page 16.

THE WITNESS: No.

MS. PARFITT: I think the question was follow-up time. Is that right?

MR. MARTIN: Whether you noted the

Page 160

increased follow-up time.

MS. PARFITT: Right. If you look at page 16 of your report.

A. Yeah. So, I mean, not specifically for each of the studies. But if you go to page 16, I do talk about follow-up in the context of discussion of these studies, not specifically in that section on O'Brien.

But this is where I'm discussing in the section on the Health Canada reports assessment of these studies where they talk about follow-up time. Only four years of follow-up -- the NHSII was added to the O'Brien analysis, and only four years of follow-up was added.

Q. When you're talking about these studies -- when you're talking about the Gonzalez study in the second paragraph under "cohort studies" --

A. Sure.

Q. -- and you note a median of 6.6 years of follow-up, that's the initial Gonzalez study; correct?

A. That is true.

Q. Not the updated version, O'Brien?

A. No.

Q. Similarly, when you talk about Houghton in

Page 161

the next paragraph, 12.4 --

A. That's the initial. And I think those are the references cited there.

Q. Okay. Can we skip back to page 11 of your report?

MS. PARFITT: '23 report?

MR. MARTIN: '23 report.

MS. PARFITT: Thank you.

Q. This gets back to what we were talking about earlier about statistical significance in P-values. It's the second-to-last paragraph of page 11. "The authors interpreted an HR of 1.08 with a lower bound of 0.99 as being no evidence of an association, which is inconsistent with the American Statistical Association statement."

So I take it that you consider a 1.08 HR with a lower bound of .99 to represent an association?

A. Not only I do. They do, too, in their subsequent -- you know, in the response to the letter. They just state that this -- and I'm going to read it --

MS. PARFITT: "They," you mean?

A. Dr. O'Brien, et al. Obviously, I do but --

Q. We're going to get to the responses to the

Page 162

letter by both Dr. O'Brien as well as Drs. Cramer and Harlow in a little bit.

My question is whether you consider an HR of 1.08 to be a strong association.

MS. PARFITT: Objection. Form.

A. Yeah. So, again, I think of strength not, you know -- and I know some people -- and I may have used terms like "moderate" and "strong" in the past. But, you know, "strong" is more in the appropriate context. I mean, is it in the appropriate public health context and for an individual patient?

If there is a preventible risk factors -- for example, let's say reducing cancer by eating fruits and vegetables -- 1.09 would be very strong.

Q. In terms of evaluating whether an observed association is causal in the first instance, do you consider a 1.08 hazard ratio to be strong?

MS. PARFITT: Objection. Form.

A. I wouldn't even -- I wouldn't even, you know -- I don't -- I wouldn't say that that's what -- I wouldn't start -- I would just interpret it in the context of other data, you know. I can't look at just one piece of information, 1.09. What's the other context? Is there a biologic plausibility? Is there dose response? I don't think you can look

Page 163

at association and say "Well, it's strong or not strong" and consistency or inconsistency.

Q. Let's go back to page 10. This is your discussion of the O'Brien subset involving women with intact tubes. "However, they conducted a prespecified analysis evaluating the risk of ovarian cancer among women with patent reproductive tracts. The analysis showed a statistically significant excess risk for ever users and never users, even after adjustment for various risk factors."

First of all, is access risk for ever users and never users a typo there?

MS. PARFITT: Objection. Form.

A. Should be "versus."

Q. That's what I thought.

A. Yeah. "Versus never users." Yeah.

Q. How do you balance that result with the result we talked about earlier from Cramer that showed a higher odds ratio for women with a tubal ligation or hysterectomy?

MS. PARFITT: Objection. Asked and answered and covered in his 2018. But you may answer.

A. Yeah. So, I mean, again, those are two different populations. You know, Cramer's

Page 164

population is different. We have -- you know, if you look at NHSII and Sister Study, these are younger -- you know, younger women. You know, some of the recruitment was for oral contraceptive use.

Tubal ligation occurs at different ages. Hysterectomy occurs at different ages. So the -- where they impact hazard ratios, you know, you can't compare one study to the other.

Q. Okay. So let's flip to page 11, the first full sentence, "Other epidemiologic studies have noted a significantly increased risk of ovarian cancer with no tubal ligation compared to those with tubal ligation." Would you agree that some studies have noted the opposite of that?

A. That is correct.

Q. Let's turn back to page 52 of the O'Brien study. When you get there, it's going to be the final paragraph of page -- of the first column.

A. Is it, like, a text or --

Q. Yes. It's text. It should start with the words "Statistical tests."

A. The "results" section?

Q. No. It's right before the "results" section.

A. Okay.

Page 165

Q. "Statistical tests were two-sided, and the P-value of less than .05 was considered statistically significant. Because of the potential for Type 1 errors due to multiple comparisons, finding from subgroup and sensitivity analyses should be interpreted as exploratory. All analyses were conducted in SAS9.4."

What do you -- can you explain the concept of multiple comparison testing?

A. Sure. Multiple testing is if, you know, you conduct a study and you have or -- somehow you have different questions you're trying to answer and you do more than one analysis or 10 analysis or 15 analysis or 20, then you may want to do a correction for that.

Q. Is that because running more analyses increases the possibility that one of them will appear statistically significant by chance?

A. Yes. But in this case, the analysis that -- was etiologically relevant and was prespecified is not -- I know they talk about exploratory. But they even emphasize importance -- and, again, I know we're going to discuss in the letter -- is not necessarily just a subgroup analysis.

Q. So let's actually turn to what you said,

Page 166

the exploratory discussion, which is on page 56.
A. Yeah.
Q. It's the middle paragraph of the second column beginning "When restricted."
A. So it's the second text; right?
Q. Yes. It is text, but I actually may have the wrong place. I'm sorry. I guess I'm wrong. On page 56. It's in text.
MS. PARFITT: I'm sorry, Zack. I'm not seeing it.
MR. MARTIN: It's halfway through the first for -- the final paragraph of page 56.
THE WITNESS: Give me a second.
MR. MARTIN: Begins "In this analysis."
MS. PARFITT: Do you have it now?
THE WITNESS: Yeah. Yeah. I have it.
Q. That sentence is what you mentioned earlier. Says "This finding should be considered only exploratory and hypothesis generating." That's referring to the finding among women with intact tubes; correct?
A. Yeah. No. I'm not mentioning that. I'm going to her letter, page 2097, where she states -- Dr. O'Brien states that "Therefore, even though we stated that findings from subgroup analysis should

Page 167

be interpreted as exploratory, we do not consider them all equally important and agree that the positive association among women with patent tubes is consistent with the hypothesis that there's an association between genital powder use and ovarian cancer." That's in the letter that --
Q. Correct.
MS. PARFITT: Finish. That's in the letter that what?
A. That she responded to Drs. Harlow and others who had pointed out that.
Q. Do you believe that you are using the subgroup analysis for patent tubes in an exploratory and hypothesis-generating way?
MS. PARFITT: Objection. Misstates his testimony.
A. I am or she is?
Q. Do you believe that you are in your expert report?
MS. PARFITT: Objection.
A. No. I'm looking at etiologically relevant exposure. And as was done in the first three, you know -- if you look at NHSI and, you know, WHI and Sister, they were adjusting for these tubes. So they were considering them as confounders.

Page 168

And now we know that the mechanisms -- these are the mechanisms of retrograde migration of talc. So these are prespecified exploratory. And I stress the word "prespecified" because they were looking for specific mechanism.
Q. Just, again, to get a clear record on my question, you do not believe that you are using the subgroup analysis in an exploratory or hypothesis-generating way in your report.
A. I mean, I think it is a causal -- I'm not using it as an exploratory. I'm using it as a causal, you know, hypothesis -- causal statement about talc and ovarian cancer. It's not exploratory.
Q. Let's look back at your report, page 11.
A. New report; right?
Q. New report. I'm sorry. Yes.
A. Yeah.
Q. Two thirds of the way down, it says "Inability to assess tests for patency." "The authors acknowledged they did not perform tests for patency, so women reported as being patent in this analysis may not have patent reproductive tracts." That's a concern about misclassification; right?
A. Give me a second. Okay.

Page 169

Q. Do you know how -- do you know how the data were collected with respect to women's patency in the underlying studies?
A. Self-reported.
Q. Self-reported. Do you believe most women know whether they have fallopian tubes or not -- intact fallopian tubes or not?
MS. PARFITT: Objection. Form. You can answer that.
Q. If you don't know the answer, that's fine.
A. I mean, women would know that. Yeah. But do they report it accurately? That's two different questions, you know. "Do they know it?" Is one thing. "Do they report it accurately?" It's two, you know -- two levels of questions.
Q. Let's look at Gossett 2020. Are you familiar with this? This is an editorial that accompanied O'Brien in JAMA.
A. Yes.
MR. MARTIN: Okay. We'll mark this as an exhibit. Can we go off the record for less than a minute while I look at my notes.
(A break was taken)
MR. MARTIN: Back on the record. Let's mark this as Exhibit 19.

Page 170

(2020 Dana R. Gossett, M.D. editorial, Exhibit 19, marked)
Q. This is the Gossett editorial we were talking about before the break. All right. Can we look at the second page of the editorial, which is page 30 of JAMA, first full paragraph?
Do you see the second sentence of that paragraph, "It is not possible to equate a patent reproductive tract with exposure and a nonpatent reproductive tract with non-exposure"?
And they go on and explain that the reason is because women who undergo tubal ligation or hysterectomy and use powders in the genital area cannot be assumed to have started using the product only after their surgery. Do you agree with that, generally?
A. Let me read it. Which part did you mention? "Given this" -- second paragraph?
Q. I will just ask it as a general question. Do you agree that women may undergo a tubal ligation or hysterectomy after having already used talcum powder?
A. Yes.
Q. So as a result, there may be women with nonintact genital tracts who nevertheless have

Page 171

exposure to talcum powder.
A. Yes.
Q. Because they had that exposure before they had surgery. Okay. If we can go down to the sentence starting "The fact that."
A. Yes.
Q. "The fact that there are no significant differences in the HRs in the patent," parentheses, "HR, 1.13, 1.01 to 1.26, and nonpatent subgroups, .99, .86 to 1.5, confirms the overall conclusion that there is no demonstrable statistically significant association between the use of powder in the genital area and ovarian cancer risk." Do you agree with that statement?
A. I disagree because the authors in the response to letters also disagree with that. And, you know, one interpretation of their tests of interaction would be that the nonpatent subgroups also have an increased risk because there is no difference.
So why are we assigning the patent to be nonsignificant and saying that the nonpatent is driving the results? But it could be, if there's no difference between the two groups -- what it could mean, that the nonpatent subgroups are also

Page 172

elevated. So there's different ways to interpret the subgroup analysis.
Q. Just to be clear --
A. Sure.
Q. -- is what you're saying that it could be that both groups are at risk, or it could be that neither group is at risk?
A. No. I'm saying that they -- what they're interpreting is, because there is no test for interaction that's different, the hazard ratio, that is statistically significantly higher for the patent. And, you know, the hazard ratio for nonpatent is lower and not significant. They are interpreting -- this is overall conclusion, that there is no demonstrable (verbatim).
My interpretation is it is entirely plausible that the nonpatent subgroups' hazard ratios and, you know, the hazard ratios in the patent are similar. So I have a -- not completely -- yes, it is a completely different interpretation. If there's no difference, .99 -- the group in .99 is the same as the group in the patent.
Q. Okay. And would you interpret from that that both groups are at risk?
A. Yes. I mean, that's one plausible

Page 173

interpretation.
Q. Okay.
A. I'm, you know -- I'm not saying that the non -- but when you do tests for interaction, you have to keep both plausible interpretations in mind.
Q. Is it also plausible that neither group is at risk?
MS. PARFITT: Objection. Form.
A. I mean, we already know that the patent is -- patent group was increased. It is plausible that there are no differences between the groups.
The only -- the test for interaction only tell us, because the numbers are so reduced, that there are no differences. The question is now you have to bring in your understanding of biology, retrograde migration, other studies to interpret this. You cannot just look at P of .15 and interpret that.
How do we interpret this data? She's -- I don't know he or she. But Dr. Gossett is providing one interpretation. I'm bringing another interpretation based on biology, based on other studies, that it is entirely plausible -- I am, you know -- I think the association between talcum powder products and ovarian cancer in the patent

Page 174

group is causal. It's also entirely plausible that the nonpatent groups have similar risks.
Q. Is it plausible, or has it been established?
MS. PARFITT: Objection. Asked and answered.
A. It is plausible. I wouldn't say that for --
Q. Okay.
MR. TISI: For what? I'm sorry. Continue.
A. I would say in this study the -- you know, they don't establish that the nonpatent subgroups are -- they do say that the overall risk is increased. They don't establish that for nonpatent.
Q. Okay. The sentence that runs -- that begins the end of the first column and runs into the second column, "The subgroup analysis suggesting that women with intact reproductive tracts who used powder in the perineal area developed ovarian cancer more frequently than nonusers is below the effect size that epidemiologists generally consider important and should not be selectively highlighted by the statistically unsophisticated reader as evidence of a relationship."

Page 175

A. I'm sorry. Where are you? First page?
MS. PARFITT: Go to the next page.
Q. This is the second page. It's the sentence that spans the end of the first --
MS. PARFITT: Back. I'm sorry. If you don't mind.
MR. MARTIN: No, please.
THE WITNESS: Sorry. I misunderstood the directions.
MS. PARFITT: No. No. No. You're right here. Right here. Starts here.
THE WITNESS: Okay.
MS. PARFITT: Then it goes up over here.
THE WITNESS: Got it. Sorry.
MS. PARFITT: Thank you.
MR. MARTIN: No problem.
Q. Do you agree --
A. What is the question?
Q. Do you agree that the effect size -- let me start that over.
Do you agree that the difference between women with intact reproductive tracts and women who did not have intact reproductive tracts is below the effect size that epidemiologists generally consider important?

Page 176

MS. PARFITT: Objection. Form.
A. Give me one second to read this. No. I disagree with that.
Q. Do you agree that there ever is an effect size below what an epidemiologist should consider important?
MS. PARFITT: Objection. Form.
A. Epidemiologists, you know, not only consider effect size, they need to consider bias, confounding, you know, possibility of power and sample size issues.
So, I mean, effect size is just one aspect of causal assessment. But, you know, is it a .991? Is it a point -- is it 1.1? I don't have an opinion on that. But I have examples in my report of very small effect sizes -- I'm not going to be wedded to 1.09 or 1.1 -- small effect sizes that are causal.
Q. Can we look back at your report, page 11?
MS. PARFITT: Just for the record, that's the '23 report?
MR. MARTIN: The '23 report.
MS. PARFITT: Thank you.
MR. MARTIN: If I say "report" without qualification, I mean the 2023 report.
MS. PARFITT: Thank you. Okay. page

Page 177

11?
MR. MARTIN: Yes. "Limited statistical power."
Q. "The number of cases of ovarian cancer in 24 case control studies -- N equals 13,421 -- is more than sixfold higher than the number of cases of ovarian cancer reported by O'Brien, et al. -- N equals 2,168 -- demonstrating the limited power of cohort studies to detect a significant increase in risk of ovarian cancer."
So your position is that the lack of power could be a reason that Dr. O'Brien's top-line results were not statistically significant?
A. Yeah. And I'll explain it a little bit more. So power is one aspect. But why did she get their -- the numbers, she got more cancer -- there were more cancers in NHSI, more follow-up time. There were more cancers in NHSII and some follow-up time -- but that was etiologically irrelevant -- then some more follow-up in WHI in follow-up time.
But she did not get etiologically relevant exposure periods sufficient enough that, even though the person years was million, she had enough power to detect a, you know, significant risk.
Q. What do you think is a sufficient --

Page 178

MR. TISI: I'm sorry. He wasn't finished.
Q. I'm sorry. Please finish.
A. I'm sorry. I would have had to calculate that. Post hoc power calculations are not appropriate now that we have results of the study.
Q. Do you recall citing in your initial report an article by Narod, "Talc and ovarian cancer," 2016?
A. Yes. And I remember the numbers they quoted about power.
Q. Great. So let's look back -- let's look at your supplemental report, paragraph 7 or -- page 7, which also sites Narod, first full sentence.
A. Give me a second. I'm not there.
Q. Are you there?
A. Yes.
Q. Narod, et al. estimate that upward of 200,000 women would have to be enrolled in a cohort study to detect an effect size of 1.2.
A. Sure.
Q. Do you agree that more than 200,000 women were included in the O'Brien study?
A. O'Brien is not a single cohort study. O'Brien is a pooled analysis of four different

Page 179

cohorts, each with different etiologically relevant exposure period.
This assumes that these 2,000 (verbatim) -- you know, you're following these -- it's just not a number. Right? It's, like, how much follow-up time you're going to have. Power is not just about a cohort. It's, like, how much cancer you're going to have or what duration of time you're going to follow them up. Yes, it has more than 200,000. But it's not a single cohort study. Didn't follow them for enough time.
Q. Let's talk about length of time followed. And let's talk about the Narod article, which I will mark as Exhibit 20.
(2016 study by Steven A. Narod, Exhibit 20, marked)
Q. Let's look at the first -- the last sentence of the first full paragraph on page 2, "In order to achieve."
A. Page 2, last sentence of the --
Q. First full paragraph.
A. "Prospective observational studies"?
Q. "In order to achieve statistical significance in a prospective observational (verbatim) study, we need a much larger cohort,

Page 180

e.g., we will need to study upwards of 200,000 women for ten years."
So the Narod article didn't just talk about number of women. It also discussed follow-up time; correct?
A. Where are you, just so that I know?
MS. PARFITT: Yeah. I've lost you, too, Zack. I'm sorry.
MR. MARTIN: It's page 2.
MS. PARFITT: Got it.
MR. MARTIN: The first full paragraph.
MS. PARFITT: First full.
MR. MARTIN: I'm sorry. It's the final sentence of that. Begins "In order to achieve."
MS. PARFITT: Right there. I was looking at the second paragraph. I'm sorry. I'm sorry.
Q. "In order it achieve statistical significance in a prospective cohort study, we need a much larger cohort, e.g., we will need a study of upwards of 200,000 women for ten years." So Narod did talk about follow-up time in addition to time; correct?
A. Sure.
Q. Do you know the average follow-up time in

Page 181

the O'Brien pooled analysis?
A. Yeah. Exactly. So what you're doing in O'Brien is you are adding etiologically irrelevant follow-up time from NHSII and even short follow-up in Sist to some of the relevant time. Obviously, the time will look big, but you're not following the cohorts for ten years. Where is Sist follow-up for ten years? Where is NHSII follow-up for ten years -- I'm sorry -- about NHSII.
Q. NHSI did have a follow-up of well over ten years.
A. Yeah. I'm talking about NHSII. You're adding time just to inflate the denominator, but you don't have what they're asking for. And then it's also a question of "Where did they come up with this 1.2?" That's just their, you know -- I mean, I cite it. But they said "Well, say we want to estimate this 1.2 risk." That's, you know -- somebody might want to do 1.1. Others we've seen in case control, they may be 1.3. So you may need, you know, different numbers. So that's one.
The main thing is etiologically relevant exposure. It's not just ten years of follow-up. What kind of follow-up are you getting? If you add NHSII follow-up, it's very early follow-up. So you

Page 182

mish and mash early with late.
Q. Again, you mentioned earlier today you don't believe the NHSII results influenced the pooled --
A. It is a minor influence.
Q. Minor influence.
A. Yeah. Yeah.
Q. Okay.
A. But, you know, in the pooled hazard ratio, because the point estimates are .81, you know, it appears that there's a decrease. But most of it is because the follow-up time is limited.
Q. You would agree that the average follow-up time across the cohorts pooled in O'Brien is greater than ten years.
A. Yeah. But, you know, the question is "What -- is that follow-up time etiologically relevant?" Yes, based on the Narod article, they said if you want to detect 1.2, you would need 200,000 women. But did they follow these 200,000 women? And when they did the etiologically relevant -- that is the patent tract -- they saw it.
See, the Narod article doesn't talk about any confounder adjustment. So you have to follow up the susceptible group for that period of time to see

Page 183

the risk.
Q. So let's go back to your statement that the -- none of the individual cohorts evaluated 200,000 women. Had you looked at -- did you look at individual cohorts because you do not believe that the various cohorts can be productively pooled?
A. No. They can be pooled, and they did it. But you have to look at the limitations of such pooling.
Q. Okay.
A. They were pooled. I mean, there had been pooled case control studies as well. But when you harmonize data as -- we understood how they had to make some choices about exposure and duration and frequency, the similar thing about follow-up. They pooled it together. But they pooled etiologically irrelevant -- I use that term -- versus -- with relevant, you know, that ten-year time they're talking about. And that inflates denominator.
Q. Well, I'm glad you mentioned case control studies because there are meta-analyses of case control studies that also combine different samples --
A. Yeah.
Q. -- correct? And you cite some of those

Page 184

meta-analyses in your report; right?
A. Most of them were already discussed in the prior deposition. I mean, I'm happy to discuss this --
Q. Not all of them, but yes.
A. We can talk about it. I have to go to my report.
MR. MARTIN: Can we go off the record very briefly?
(A break was taken)
MR. MARTIN: Back on the record.
Q. We were discussing before the break your comment that none of the individual cohorts had more than -- had anywhere near 200,000 women; right?
A. That's correct.
Q. Okay. Let's look at limited statistical power in -- towards the bottom of page 11 of your 2023 report.
MS. PARFITT: I'm sorry, Zack. What page?
MR. MARTIN: 11.
MS. PARFITT: Thank you.
Q. "The number of cases of ovarian cancer studies in 24 case control studies, N equals 13,421." So in this case, with the case control

Page 185

studies, you are pooling or adding together the different studies to come up with the sample size; right?
A. No. So, again, I'm not making comment about sample size. I'm just saying there is a -- the number of cases in the case control studies significantly exceeds the cases even with the largest pooled analysis. That's all.
It's not -- power calculation for case control study is not the same as -- so what Narod points out is, in the context of cohort study, you start out with exposure and measure outcomes. When you do a power calculation -- in fact, that is the efficiency of case control studies -- is their power to detect associations between exposure such as talc and -- so the power calculation -- I'm not doing a power calculation. I'm just pointing out a statement of fact, that the number of cases is more.
Q. My initial question was just whether the N equals 13,421 is pooling all 24 case control studies that you discuss there.
A. Yeah. I mean, I have to look at which reference that is. Penninkilampi --
Q. Penninkilampi?
A. -- total, name of case, number. That's

Page 186

all.
Q. Does power increase linearly with sample size?
A. Power is not only a function of, you know, sample size. It's a function of, A, which group are you talking about. Have you -- are you going to adjust for confounders? Are there strata that you're -- are etiologically relevant? So it's not just about sample size. Power is relevant to other kind of questions you set up.
Q. To the extent sample size influences power, is that relationship linear?
A. When you say "linear," what do you mean? Can you give an example?
Q. Sure. Is a six-times-larger sample six times more powerful than a sample one sixth of the size?
A. Six times more -- no. But case control studies are more powerful in terms of power in detecting association. I mean, that is irrespective of -- this number could have been only 3,000. It didn't have to be 13,000. This is just an observation of numbers.
This is not about -- but the comment about power of case control studies is in the first report

Page 187

when I talk about study designs. Case control studies are more powered to detect the associations.
Q. Is a -- even holding constant the number of cases, in other words, is a case control study that has 2,000 cases of ovarian cancer more powerful than a cohort study with 2,000 cases of ovarian cancer?
A. Again, you have to do confounding, bias, other things. But yes. I mean, you could -- in general, case control studies are more adequately powered, you know, holding other things constant.
Q. And the increased power in case control studies is not only a function of the increased number of cases they generally have.
A. No. Because they -- partly is a function of the fact that they already start out with cases. So they can, you know, recall exposure.
Q. Do you recall citing a study by Berge, 2018 in your initial report?
A. Yes.
MR. MARTIN: Can that be marked as Exhibit 21?
(2018 article by Wera Berge, et al., Exhibit 21, marked)
Q. You're familiar with the Berge article, 2018?

Page 188

A. Yeah.
Q. Can we look at page 253?
MS. PARFITT: If I can have a copy, please.
THE WITNESS: Sorry.
MS. PARFITT: No. It's okay.
A. 253.
Q. Can we look at the first paragraph of the second column beginning -- well, first of all, Berge 2018 was a meta-analysis of the case controlled and cohort studies that were existing at that time; is that right?
A. It's 2016; right?
Q. 2018.
MS. PARFITT: The bottom, 2018.
A. Copyright but accepted 2016 was -- I'm just trying to -- I don't have a problem --
Q. It's copyright 2018.
A. Okay. That's fine.
Q. But it was a -- but you are correct. It looks like it was accepted in 2016.
A. Yeah.
Q. So my question is this is a meta-analysis of the case control and cohort studies probably that were, as you said, existing as of 2016. Right?

Page 189

A. Sure.
Q. Okay. And looking at that paragraph I was pointing to earlier, beginning with "It should be noted," "It should be noted that the cohort studies included in the meta-analysis comprised a total of 429 cases of ovarian" -- "cases of ovarian cases," which I assume is a typo.
A. I'm sorry. Where are you?
Q. Sure. Middle of the first paragraph?
A. Got it.
Q. "It should be noted that the cohort studies included in the meta-analysis comprised a total of 429 cases of ovarian cancer (verbatim) exposed to genital talc and 943 unexposed cases. The statistical power of the meta-analysis of this" -- "of these cohort studies to detect a RR of 1.25, similar to the result of the meta-analysis of the case controlled studies, was 0.99. Thus, low power of cohort studies cannot be invoked as explanation of the heterogeneity of the results." Do you disagree with that statement by --
A. Let me read it first a little bit. I completely disagree with them. I think they are conflating two different issues. They are saying that there are 429 cases in the -- it should be

Page 190

noted that cohort studies included in the meta-analysis comprise a total of 400 cases and 940 unexposed cases. What is unexposed cases? Is it controls?

Q. I believe they mean cases of ovarian cancer who are not -- who are not exposed to talcum powder.

A. The statistical -- I'm just trying to unpack what are they trying to say. The statistical power of the meta-analysis to detect an RR similar to the results of the meta-analysis -- okay. So they are saying "We want to do a power calculation for 1.25." Was .99? I don't know how they come up with that number.

Q. But you have not done a formal power calculation of this type of your own; right?

MS. PARFITT: Objection. Form.

A. I don't know -- I have to go back and look at my previous report if I -- I know I talked about power. I don't know if I did a power calculation.

Q. You did not do one in your 2023 report.

A. No. And the reason is post hoc power calculations are, in fact, you know, frowned upon and not statistically appropriate. Even in this case, once they have completed the analysis, trying to invoke power as an explanation for the

Page 191

calculation, as in, like, .99 -- "Oh, they have a lot of power." No. It's a design issue. You begin -- you start to think about power before you design the study.

Q. So is your testimony that the statistical analysis done in this Berge study is inappropriate?

MS. PARFITT: Objection.

A. It is flawed. It's methodologically flawed because this power calculation is post hoc.

Q. Let's look at Exhibit 22, Taher, et al., 2019.

(2019 article by Mohamed Kadry Taher, et al., Exhibit 22, marked)

Q. So you talk about Berge or -- excuse me. You talk about Taher on page 5 of your 2023 report --

A. Sure.

Q. -- Paragraph 2.

A. Let me get there. Yeah.

Q. You talk about the odds ratio and confidence interval reported in this study. Let's go and look at Table 2 of the Taher study, which is all of page 93.

Let's go to Bullet 4 in that table -- which candidly is not the most clear presentation of data

Page 192

I've ever seen -- to tumor histology. Do you see where I am?

A. Yes. Okay.

Q. Okay.

MS. PARFITT: Are you there?

THE WITNESS: Yes. I can see it.

Q. What's the effect estimate for mucinous cancer?

A. 05 with wide confidence intervals, .85 to 1.29. Is that -- I mean, I'm looking at the rows across.

Q. That's correct. That's what I see as well.

A. It's not very easy to.

Q. That's what I see as well. Do you consider that to be data that supports an association between mucinous cancer and talcum powder exposure?

MS. PARFITT: Objection.

A. You know, I've evaluated -- again, sort of going back to my assessment of epithelial ovarian cancer. I mean, here, there are data suggest -- pointing out to increase endometrial. The numbers when you go to mucinous are so low that it is not -- you know, that the fact that they see only 1.05 is reasonable. But my assessment is on epithelial ovarian cancer, of which mucinous is a subtype.

Page 193

Q. So my next -- I'd like you to look at clear-cell. You see the effect estimate there is 0.63 with a very wide confidence interval?

A. Yeah. But other studies have reported elsewhere. You know, Terry's pooled analysis, you know, provided an increased risk of -- yes. In this analysis, they don't report it. But I'm not going to disaggregate -- I mean, it is relevant that these are different histologic subtypes of cancer. But my causality assessment applies to epithelial ovarian cancer.

Q. Did you say -- did you mention an article that you think shows an association between clear-cell cancer and talc specifically?

A. Terry.

Q. Terry.

A. Yeah.

Q. That's Terry 2013?

A. Yes. We can look it up.

MS. PARFITT: No. We talked quite a bit about Terry in the last deposition.

Q. But just to, again, be clear, your analysis is not broken down by histological subtype.

A. No. I'm just focusing on -- I'm pointing out where data suggests this or that.

Page 194

Q. Okay. Let's look at the "duration of use" bullet, which is about halfway up the page in the same --
A. Table?
Q. -- table.
A. They have to do better tables.
Q. Some lines would be helpful, really.
A. Okay. Got it.
Q. Okay. Do you see that 20-plus years produces the lowest point estimate and the only one that's not statistically significant?
A. Yeah. But that's only one -- that's one aspect of exposure. We've discussed, I think, in the past report and -- that exposure is not just duration. It's intensity. It's frequency, application. And then if you extend to the Table 4, it provides several studies that provide -- Table 3 -- sorry -- several studies that provide, you know, the right metric for those estimations, not all of them, you know. There are some studies that do not.
But there are some studies that provide, based on the appropriate metric, such as Cramer, Harlow, Mills, Whitmore, Wu, and Schildkraut. I don't know how you spell that. It depends on the

Page 195

metric and the specific study.
Q. Would you agree that, to the extent studies are able to estimate total lifetime applications, some of them demonstrate a dose response and some of them do not?
MS. PARFITT: Objection. Form.
A. I mean, I talked about in general, you know, the whole body of evidence in dose response. Some studies provide evidence of dose response. And, you know, I have to go back and look at the references in my previous report because that clearly outlines which is frequency, which is duration, which is frequency and duration. And, you know, you can bring it up, and we can go through study by study.
Taher, what he does is he -- I presume -- is he identifies five studies in the positive trend with frequency. Two studies suggested there might be an exposure response. Then there are other studies that did not.
So there's, you know -- that's why in my causality assessment, you know, I provided that context in assessing dose response.
Q. Let's look at -- let's go one page back or -- two pages back. I apologize. Three pages back.

Page 196

A. Table 2 again?
Q. No. I'm sorry. All the way back to page 91, Section 3.1. First sentence of the final paragraph, "63 percent -- N equals 19 -- of the studies concluded the presence of a positive association between perineal" --
MS. PARFITT: Do you see that?
THE WITNESS: Where is that?
MS. PARFITT: Page 91. He's on the wrong page.
THE WITNESS: I'm on the wrong page.
MS. PARFITT: 91. Here at the bottom. 63.
THE WITNESS: Got it.
Q. Do you see "63 percent -- N equals 19 -- of the studies concluded the presence of a positive association between perineal talc -- exposure to talc -- perineal exposure to talc powder and ovarian cancer risk. 10 studies concluded the absence of an association. Only one study could not reach a clear conclusion"? Do you believe that shows consistent literature?
A. Yeah. To go to consistency, it's not just about "This study showed this," you know, showed a positive -- I mean, you'd have to actually read my

Page 197

section on consistency.
Consistency is about, you know -- there's going to be different point estimates because different study designs and populations and whether it's case controlled or cohort, even within case controlled. But are there confidence intervals overlap? When they pool these estimates in the same Table 2, they don't find evidence of statistical heterogeneity, if you look at the I squares for case control or cohort.
So consistency involves examining study design. What does Bradford Hill talk about? Person, place, and time. We have different persons conducting these studies in different parts of the world across several decades. We have no stat -- not no but very minimal statistical heterogeneity and confidence intervals that overlap.
So yes, I agree there's consistency in this literature. And actually, my opinion, there's strong evidence of consistency.
Q. So let me ask you about little evidence of heterogeneity in the literature. Do you believe that there's little evidence of heterogeneity between the case control studies as a group and the cohort studies as a group?

Page 198

A. You misconstrued what I said. Little evidence? Statistical heterogeneity in the meta-analysis and then a specific measure of that known as I square.

And so if you look at the I squares at -- in the hospital base or population base, usually, you know, 50 to 70 percent are considered significant. And all the meta-analysis never reach that. So it's, like, 22 percent in the case controls. And even Penninkilampi doesn't get there.

So that's an evidence of statistical, you know -- lack of statistical heterogenic -- that answer to the question that there's evidence of -- there's evidence of consistency, despite differences in point estimates, despite differences in study design. So Penninkilampi, at least at that time, had, you know, included those.

Q. When you look at the 22 percent I-squared statistic for case control studies in Table 2 --

A. Sure.

Q. -- do you understand that to be a statistic referring to comparing case control studies to each other or case control studies to other types of study design?

A. No. Those are pooled estimates for the

Page 199

case control studies.

Q. Okay.

A. Yeah.

Q. 22 percent number there doesn't address heterogeneity between case control and cohort studies; right?

A. No. And that we can look at in the Penninkilampi meta-analysis. We should look at that.

Q. That was published in 2018. And I think I will get in trouble if I look at that. So let's --

A. No. But there are other -- when you pool them, you still don't reach that level of concern about statistical heterogeneity.

Q. Let's look -- well, do you know what the GRADE framework -- all capital letters -- is?

A. Yeah. I've written chapters for the --

Q. Can you explain it to me?

A. GRADE frameworks is not one thing, you know. GRADE framework is a way to provide, you know, decision-makers evidence on use of interventions that usually apply -- you know, you have a body of evidence. You conducted a systematic review. Now you want to make guidelines or some other decisions about using that product or using it

Page 200

in practice.

Then you have to look at risk of bias, look at how that evidence is direct to your question, how precise is it, is it a publication bias. And then you can make a conclusion.

Usually, GRADE is -- just by the fact that data here are observational, it assigns a low GRADE to observational studies because it doesn't matter in this context or any other.

It starts out with low for observational studies. An observational study can only be up-coded for, you know, directness or if there's a confounder that actually bias them towards an amount.

So yes, I'm very familiar with the GRADE framework. Actually, there's a publication on GRADE in my CV.

Q. If you look at 4.4, Section 4.4, which is page 98 of this.

A. Section 4.4. Yeah.

Q. You can see that Taher did this GRADE analysis here.

A. They did.

Q. And you agree they graded the evidence very low?

Page 201

A. Yes. Because they were looking at observational data. But despite that, you know, they rated the studies in that Table 2 we were looking at as, you know -- between the high and low risk of bias as, you know -- a lot of them as low risk of bias, which provided an increase.

But here, they say that. But, you know, they use the same data that -- when they go to the full report -- which, you know, you'll probably bring out some point in time -- they provide that this data indicative of a causal association.

So GRADE is not necessarily a decision-maker here. You know, GRADE is providing evidence for decision-makers. But here, when we are making causal determinations based on epidemiology -- which is the only thing we have here. We're not going to have trials.

Q. Well, let's look at what they say "very low" means. In Footnote A to this Table 4, they define "very low" as --

A. Yeah.

Q. -- "We have very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect." Do you agree with that understanding of a

Page 202

very low GRADE?
A. No. I don't think so. And I don't think -- if that was what they had interpreted, then why would -- why wouldn't they have said that "We maintain our conclusion that talc is a possible cause of human cancer in humans based on the totality of evidence" and then gone on to write a report which says that "We are confident in our conclusion that there's a causal association" based off the same data?
Q. So let's look at the -- what you just mentioned, which I believe is on the next page. I'm trying to --
A. No. It's in the same -- up line -- second paragraph.
Q. No. I'm looking at the following paragraph at the beginning of page 99 halfway through. I thought that's what you were --
A. No, I'm not.
Q. -- looking at as well because it says "Despite the very low certainty assigned by the GRADE evaluation, which heavily favors RCTs" -- which you mentioned earlier, randomized control trials --
A. Yeah.

Page 203

Q. -- "we maintain our conclusion that talc is a possible cause of human cancer in humans, based on a totality of the evidence." That's what I thought you were referring to earlier.
A. I was. But then I also -- they use largely the same data. They update it in the Health Canada report and go further and say that "We are confident that there is indicative of a causal association." So I have done lots of grading myself. And I'm just trying to explain how it works.
You know, most of the observational literature we do, we start out with low. And you are sort of stuck with the framework. It was really designed to assess interventions, like drug pharmaceutical trials and randomized control trials. It wasn't designed for this particular --
Q. So I just want to focus on the "talc is a possible cause of human cancer" that you brought up here in this passage. Then we can talk about Health Canada.
Is it your opinion that talc is a possible cause of human cancer, or is it your opinion that talc is a cause of human cancer?
A. No. I'm just quoting the statement they state here, despite all the limitations. I believe

Page 204

-- I'm of the opinion that talc is, you know, causal and relates to the -- is a causal risk factor in the development of ovarian cancer.
Q. Would you agree with me that that's a step further than the statement here in this paragraph?
A. Yes. Which is the same statement they made in Health Canada. Yeah.
Q. You would agree with me, also, that it's -- that what -- the statement in this paragraph is consistent with IARC's classification of talc.
A. Yeah. But that was in 2006. There was hardly any -- there were some studies at that time. But they didn't have all the data that they had or I have now.
Q. I'm just trying to understand the meaning of "possible" here.
A. Yeah. But remember, you know -- so let's unpack that a little bit. When you say "possible" and "probable" in that context -- IARC context -- it's not the same as here, Taher. "Possible" and "probable" in the IARC context could mean Group 2B to Group 2A. We're not talking about that here.
I mean, they don't even explicate are you talking about mechanistic data, are you talking about animal data, have you ruled out bias,

Page 205

confounding. So you can't just use terms "possible" and "probable" in the same sentence and equate this to IARC.
Q. Okay.
A. IARC is different. And I've done the work for IARC too.
Q. You mentioned Health Canada, which includes some of the same --
A. Yeah.
Q. -- scientists as this and, you suggested, reached a stronger conclusion about the carcinogenicity of talc than this article did?
MS. PARFITT: Objection. Misstates the testimony and the evidence.
A. I just -- my -- I'm just going to say what conclusion they read. You interpret it as stronger. They interpret it as confidently evidence of a causal -- indicative of a causal association. That's all I mean. It is strong.
Q. So we may get to the Health Canada report later this afternoon, but I just want to ask you now. Do you know the standard of review which Health Canada uses under Canadian law?
A. I mean --
MS. PARFITT: Objection.

Page 206

A. -- they are a regulatory body. I mean, I don't know all the specifics of -- yeah. But, I mean, they have a 350-page supplement. I was trying to review it. They are very detailed, very meticulous. I am very impressed with their work.
Q. Do you understand the standard applied in regulatory law to be the same as the standard applied in tort law?
MS. PARFITT: Objection. Form.
A. I mean --
MS. PARFITT: He's not a lawyer.
Q. If the answer is you don't know, that's fine.
A. I'm not a lawyer. I mean, I provide an epidemiologic assessment on causation. I'm familiar with IARC. I'm familiar with GRADE. You can ask me all questions you want about how IARC comes to probable and possible or, you know, sufficient evidence.
The only thing I review is the details and the methods and how did they come to that conclusion. And they evaluate O'Brien. In fact, several studies have been published after Health Canada published their report.
Q. Are you familiar with Davis 2021?

Page 207

A. Yes.
MR. MARTIN: Okay. Let's mark this as the next exhibit.
(2021 article by Colette P. Davis, et al., Exhibit 23, marked)
Q. You talk about this in pages 8 and 9 of your expert report, I believe.
A. Give me one second. Let me give it to them. You said which page?
Q. I haven't said a page yet.
A. Okay. You said some page of your report.
Q. Yes. I'm sorry. It's -- I was just saying you talk about Davis on pages 8 and 9 of your report.
A. Okay. That's all.
Q. I believe.
MS. PARFITT: Do you have the Davis? May I have one copy of that?
Q. So you see Dr. Moorman's name in the list of authors on page 1660 of the Davis article?
A. Yeah.
Q. It's the list of authors.
A. Yeah. I didn't go through all the list, but I see it now. Yes.
Q. Are you aware that Dr. Moorman is a plaintiffs' expert in this litigation?

Page 208

A. Yeah. I skimmed through her deposition.
Q. We've asked this a couple of times. Did that affect the way you evaluated the Davis paper in your expert report?
MS. PARFITT: Objection. Asked and answered.
A. You know, it's the same. I looked at the methodology. I looked at disclosures. But, you know, this is a, you know, consortium of researchers, ovarian cancer -- they've published many studies, not only these studies -- well-reputed scientists, not just Dr. Moorman but others as well.
So, you know, it's not just her study. Right? It's all these people. Schildkraut has conducted many studies. So I have to look at the methodology.
Q. You understand one of the purposes of this study or the primary purpose of this study was to examine talc use specifically in the African American population; correct?
A. Yeah.
Q. Okay. And would you agree with me that some studies show a greater use of talcum powder among African American women than white women?

Page 209

MS. PARFITT: Objection. Form.
A. That is correct.
Q. Can we turn to page 1663, first paragraph, the sentence that begins "Across most study sites"?
A. 66?
Q. 63.
A. I'm sorry.
Q. "Across most study sites, AA cases and controls had a higher prevalence of ever use, frequent use, and long-term use of genital powder than white cases and controls."
So would you agree with me that African American women not only used talcum powder at a higher rate but use it more frequently on average and for longer term on average?
A. Based on this study, yes.
Q. Okay. Let's turn to Table 3. It's 1665. It's the top of 1665. Okay. And the all-case point estimate for African American women is 1.22 with a confidence interval that crosses 1. Do you see that?
A. Yes.
Q. You see that, among white women, it's 1.36, a higher point estimate and statistically significant confidence interval? Do you see that?

Page 210

A. Give me -- yes.
Q. Okay. Do you have a theory for why the risk would be lower among African American users, despite using the product more frequently and for a longer period of time?
A. I don't think it's lower. It's -- those two estimates are -- the authors conclude that they are no different. The tests of interaction were not significant. The confidence intervals are not -- you know, overlapping. So I don't think they are lower. I mean, those are -- the point estimates appear to be lower, but.
Q. You mentioned the confidence intervals are overlapping, despite the fact that the point estimates are different.
A. Are lower.
Q. The point estimate for African American women is lower. When we were talking about the top-line results in O'Brien, you told me that it didn't matter that the confidence interval overlapped 1.0. So I'm just trying to understand --
A. Sure.
Q. -- when you look at point estimates and when you look at confidence intervals.
A. I look at both. There's no, like,

Page 211

selective looking. It's, like, when you're trying to compare the confidence intervals to examine consistency. So it's not like you're making a statement about strength. It's more about "Are the two findings consistent?" And we should say what they stated. Give me a second, and let me see what they state about the results.
In this study, ever use was associated with higher odds in both AA and white women. And the population was similar in those groups, was -- that's it. So there's no difference between the two groups. No evidence of heterogeneity by race was observed.
Q. What I'm struggling with is, if the white results and the African American results are consistent because their confidence intervals overlap, why wouldn't that mean that the O'Brien results are consistent with 1.0 because the confidence interval overlaps that? What's the difference?
A. With whom?
MS. PARFITT: Objection. Form.
A. So the question is these -- I'm comparing two different studies. You know, not even -- two different analysis. And here, you have a test of

Page 212

interaction that is not significant.
So you have two where they state that both are elevated and test of interaction was not significant. And there's, you know, there's a lot of overlap. They're the ones --
Q. Can you point me to the test of interaction, please? I'm not seeing it.
A. Yeah. So you go to the second paragraph of the results -- okay -- "Ever use of genital powder" -- in page 1663.
Q. Yes.
A. Second paragraph, ever use was associated with 32 percent higher risk. Then they provide a confidence interval. When stratified by race among -- the 36 percent among white women pooled also shows significant, and nonsignificant higher risk among African American women. So, you know, again, 36, 22 (verbatim) but no evidence of heterogenic. So that is a test of interaction. That's what I'm basing -- it's not just confidence intervals. There's a test of interaction.
Q. Is it your position that, when a point estimate is elevated and P equals 0.33, that does not show a difference?
A. Where is P 0.33?

Page 213

MS. PARFITT: Objection. Form.
Q. "No evidence of heterogeneity by race observed," parentheses, "P equals 0.33."
A. Yeah. So that is their conclusion. It's not just my conclusion. There's no evidence of -- that's a test of interaction, P-value. That's not a test -- that's not a stratum-specific P-value. That's, when they compare the two groups, what is the P-value? It's a stratum, you know. It's for the test.
Q. Understood. Understood.
A. And I do agree with the authors that there's no evidence of heterogeneity by race.
Q. You pushed back strongly this morning on drawing a firm line at P equals 0.05; correct?
A. Sure.
Q. You do in your report as well.
MS. PARFITT: Object to the form. You may continue.
Q. At what P-value do you draw the line to say that two values are different from one another?
A. So I wouldn't draw the line. I'm just, you know, interpreting what they said in terms of tests of interaction, which are notoriously underpowered. So even though they're underpowered, there are no

Page 214

difference.
I don't have a P-value which I can say that, you know -- and sometimes authors, you know -- it depends on the context. You know, is a P of .051 not significant or P of .049 not -- P-value is just a statement that the data you have, you know, is -- the probability of having a data as a more extreme under the hypothesis being two. It has no direct relevance to clinical significance other than interpretation. You know, it's a statement of the null hypothesis.
Q. Do you have to draw the line somewhere?
A. Yeah. I mean, you have to draw the line in the context of what other data you have.
Q. Can we turn to 1667? Last sentence of the article, "Furthermore, there was not a dose-response relationship between frequency or duration of genital powder use in ovarian cancer risk or any significant differences in association by histotype." Did you consider this in your dose response section of your report?
A. Yeah. I mean, it's in the -- noted. I'll read it for you. There was no differences. I have the exact statement: "By frequency of" -- page 9 -- "By frequency of genital powders" -- if you go to

Page 215

page 9 of my report, it talks about "There was no difference in the association by frequency of genital powder use, although both reported an increased risk."
Q. My question was about the section of your report where you discuss -- you know what? Strike that question.
Can we move back to the previous column on the same page?
A. I didn't finish answering the question. You asked me a question.
Q. I'm sorry. I thought you were done.
A. No. You asked me a question, "Did you discuss the data of no dose response relationship in your report?" And I want to point out page 9 of my report, second-to-last paragraph explicitly discusses that.
Q. Okay. Thank you. If you move to the previous column on page 1667 of Davis. Right. First full paragraph, second paragraph -- and this is, again, talking about dose response. Do you see where it says "We observed"?
A. Sorry. Second column?
Q. First column, second paragraph, "We observed."

Page 216

A. Yeah.
Q. "We observed no clear dose-response trends. In contrast, AACES" --
MS. PARFITT: No. No. Read the whole sentence. Says "We observed no clear dose-response trends for frequency or" --
Q. "Frequency or duration of genital powder use and ovarian cancer risk among AA women or white women. In contrast, AACES reported significant trends for both frequency -- less than 30 times per month," comma, "daily use, and duration, less than 20 years, greater than or equal to 20 years of genital powder use respectively.
"While different than AACES's, our results" -- meaning the no-dose-response results -- "are consistent with most prior studies that report no significant dose response association between genital powder use and ovarian cancer risk." Do you agree with Davis's summary of, quote, "most prior studies"?
A. No. And you can go back to my previous testimony, cites the studies that have, cites the studies that don't. And when they say "most," you can look at the references. They have, you know, 21 to 25. So that's five, you know -- five -- 21 --

Page 217

that's six studies.
We already saw, in Taher, he presented data from seven studies. You know, five are consistent and then two suggest. So I don't know what interpretation they provide. But in their study, they did not find. And that, I have included in my report.
Q. Yeah.
A. And most importantly, they did not ascertain the duration and frequency -- the lifetime applications, which is appropriate way to address dose.
Q. You would agree that some of the studies on which you relied for showing of dose response also do not ascertain --
A. Yes.
Q. -- the exact lifetime use.
A. Yes.
Q. Okay. Can we flip back to page 1663?
A. Yes.
Q. Second paragraph, "When restricted to" -- in the middle of the paragraph. Do you see that?
A. Give me a second. First column or second?
Q. First column. Thank you.
MR. TISI: Where are you?

Page 218

MR. MARTIN: Page 1663, second paragraph.
A. Yes.
Q. "When restricted to women with patent reproductive tracts, the OR among all women was 1.27, 1.09 to 1.48. Among women without patent reproductive tracts, the corresponding OR was 1.42, 1.17 to 1.72." Did you consider this study in your evaluation of O'Brien's patent reproductive tract data?
A. When you say "this study" and "that data," I mean, you look at the P for heterogeneity. It's, again, nonsignificant. So it is -- I'm going to go to my section and see what I commented or not. Yeah. I did not comment on that.
But when they did the stratum-specific analysis, while they report a higher risk with -- without tracts, again, they are not different. And that actually goes to my counterargument for Gossett, that it is entirely plausible that women without patent tracts have risks similar to women with patent tracts. That's what you're seeing here.
So yes, if we consider this, then -- although these are not different. I don't think they are different estimates. These are overlapping

Page 219

estimates. Test of interactions are not significant, but interpretation could be that women with patent and nonpatent have similar estimates.
Q. Let's look at Perez 2018.
THE WITNESS: If you have several questions, I'll take a break.
MR. MARTIN: Yes. We can take a break now. Off the record.
(A break was taken)
MR. MARTIN: Back on the record. Before we went off the record, I shared with you a Perez study but --
THE WITNESS: I don't have it.
MR. MARTIN: -- we're not going to do it. Instead, we're going to move on to Tanha 2021, which I'd like to have marked in place of the previous exhibit.
(2021 article by Kiarash Tanha, et al., Exhibit 24, marked)
Q. This is cited in page 6 and 7 of your supplemental expert report.
A. Yeah. It's a brief reference to that.
Q. Yeah. And what you say in your supplemental -- I'm sorry. I really shouldn't -- it's page 6 of your expert report, Paragraph 3.

Page 220

"Tanha, et al. conducted an umbrella review of two systematic reviews and reported that perineal talc use was associated with a statistically significant increase in ovarian cancer, OR 1.279" -- excuse me -- "297, 95 percent CI, 1.242 to 1.355, P less than .001. Without any evidence of statistical heterogeneity among studies, I squared equals 0 percent."
Can we look at the Tanha study we just had marked, page 14, Table 2. Let me know when you're there.
So perineal talc in Table 2, it says "OR 1.297." And for that row, there's an I squared of 0.0. Says there's two studies. Then it says "RR 1.250, I squared 38.11," two studies. So would you agree with me there's four total talc studies included in the Tanha article?
A. Not really. I mean, I don't understand when you say "RR."
Q. I count four?
A. Which are the four?
Q. No. 6 -- turning back to Table 1, page 3.
A. Okay.
Q. No. 6 is Penninkilampi. Do you see that?
A. Table 1 -- okay. Table 1. Yeah.

Page 221

Q. Then continuing in Table 1, No. 13, the Berge talc use study. Do you see that?
A. Sure.
Q. Okay. And continuing in Table 1 -- I had these marked in my previous copy. But on page 8, No. 247, the Taher study of perineal talc use.
A. Yeah.
Q. Okay. And on page 5, No. 124, the Huncharek study of cosmetic talc use.
A. Yeah.
Q. Okay. Now, turning back to -- so you'd agree with me there are four talc studies included in Table 1 here --
A. Table 1, yeah.
Q. -- that we just went over.
A. Four meta-analysis.
Q. Yes. If we go back to Table 2, you see two meta-analyses that reported odds ratios and two that reported risk ratios.
A. I don't -- so that's the question I have. Let's figure out which -- how could these meta-analyses report risk ratios, because these are case control studies. Let's find out which meta-analysis reported -- let's bring out the four meta-analysis and see if they reported risk ratios.

Page 222

Q. This is the article you cited in your expert report. I'm asking you if you know, based on what you put in your expert report, what they're citing here for the odds ratio and what they're citing for the risk ratio.

A. Yeah. I'm aware of that. Yeah. And I think odds ratio estimate is more appropriate when that -- when the -- when you are pooling case control studies and cohort studies. I mean, I don't -- risk ratios are not appropriate -- not -- not appropriate.

But odds ratios are more appropriate for case control studies. And I'm -- I would have to go back and look at those four citations because Taher, I know, reports on odds ratios. Penninkilampi also reports on odds ratio. Let's see. You know, let's bring out the other two. You said Berge. And what else was it?

MS. PARFITT: Huncharek.

Q. We're not going to do it for the sake of time.

A. No. But you're right.

Q. I'm going to ask why you chose to include the odds ratio but not the risk ratio in your expert report.

Page 223

A. Odds ratio is much more relevant for rare outcome. I don't see any difference between the two. I mean, it's still, you know, 1.25, still significant. The estimates are -- I squared is 38.1, still not a concern when you think about statistical heterogeneity.

So it doesn't make -- you know, both are similar. I don't know how they would even estimate risk ratios. Maybe those studies had. But then what is -- because lot of, you know -- most of them are case control studies. So they are using odds ratios.

Q. So would you agree that all four of these studies -- Penninkilampi, Berge, Huncharek, and Taher -- were included individually either in your 2018 or 2023 report?

A. Yes.

Q. Okay. So what, if anything, does the Tanha study add to what those studies already provided?

A. I'm just updating my review. I'm adding, you know, whatever other people have evaluated. It's a different study design. It's an umbrella review. So they have looked at other reviews.

So, again, this is not -- this is not sort of driving my -- as you asked, you know, that, okay,

Page 224

you know, is this -- how would we know which studies you're basing your opinion on. This is one review. I found it and reported it.

Q. This is not -- this Tanha article is not just about talc; right?

A. Yeah. There's other risk factors, multiple -- in fact, talc is a small portion.

Q. Right. So can we look at the first paragraph of the "discussion" section on page 10?

A. Page?

Q. 10. Can you just review that paragraph? And then we'll break it down sentence by sentence, but can you take a moment to read all of it first.

A. Yes.

Q. So the first thing they say is -- well, they say "As regards nutritional factors, intake of coffee, egg, and fat can significantly enhance the risk of OC." Do you see that?

A. Yes.

Q. And then they say "Estrogen and progesterone therapies are also associated with elevated risk of OC. Several diseases, as well as some genetic polymorphisms, can significantly increase the risk of OC. And other factors, like obesity, overweight, smoking, and the use of

Page 225

perineal talc, are also accompanied by an increased risk of OC."

A. That is correct.

Q. Do you see that, with regards to coffee, eggs, and fat, they say "can significantly enhance the risk," and with regards to "obesity, overweight, smoking, and talc," they say "are also accompanied by an increased risk"?

MS. PARFITT: You're referring now to the very last sentence.

MR. MARTIN: Yes. Correct.

A. Yeah. Yeah. I did not disentangled coffee, egg, or fat and get into the minutia of, you know, significantly or not. I mean --

Q. I'm sorry. I didn't want to cut you off.

A. Yeah. I just want to say that, you know, this was an umbrella review relevant to the question. Was just cited. As you can see, I devoted two lines to it.

Q. So you don't have an opinion on whether there's a difference in meaning between "significantly enhanced the risk" and "accompanied by an increased risk."

MS. PARFITT: Objection. Form.

A. First of all, you'd have to do a causal

Page 226

analysis of coffee, ovarian cancer. I don't -- then I would be worried about it. I'm drinking a lot of coffee. So, I mean, that's a different, you know -- you'd have to look at it. I don't know what the results on coffee are.

Q. Well, that was my next question. You don't have an opinion on eggs, coffee, or fat, do you?

A. No. Obesity, yes, but not on eggs, coffee, and fat.

Q. And your opinion is obesity can increase the risk of ovarian cancer.

A. That is correct.

Q. Let's look at page 15 of this study, final paragraph before the conclusion, so the second column, "The ovarian carcinogenesis mechanism of perineal talc use has remained unclear." Do you agree with that statement?

A. No. No.

Q. No. And why don't you agree with that statement?

A. I mean, I think the evidence for that is becoming much more, you know -- is as solid as Health Canada says, and Dr. O'Brien states that in, you know, in one of her articles, that there's, you know -- talc is an insoluble particle and has --

Page 227

there's evidence of retrograde migration of talc.

And in animal studies, when applied, it can cause epithelial reaction and trigger a chronic inflammation which can lead to a series of mutagenic changes and lead to carcinogenesis, which is further aggravated if it contains asbestos.

Q. So you mentioned Health Canada. Let's take a look at that.

A. Which number is that?

Q. I don't think we introduced it yet. I have a marked-up version of Health Canada. Where is that?

MS. PARFITT: Hold on.

(April 2021 Health Canada document, Exhibit 25, marked)

Q. I gave you a version. Are you looking for yours with notes?

A. Yeah.

Q. So because we were talking about plausibility and migration, I want to turn to page 19 of the Health Canada report.

In fact, you do, in your report, as well as in your testimony here, rely on Health Canada for the idea of retrograde migration; right?

A. Yes.

Page 228

Q. Okay. Want to look at what Health Canada says specifically. Second to last -- well, first full paragraph on page 19, second-to-last sentence, "Studies specifically assessing potential movement of talc particles through the human body were not identified in the literature."

A. Where is this?

Q. Second-to-last sentence.

A. Page 19?

Q. Page 19, yes.

MS. PARFITT: Wait until you find it.

A. "Translocation," blah, blah, blah. Where is that?

Q. It's about two thirds of the way through the first full paragraph, "Studies specifically assessing."

A. Yeah. Yeah. Got it.

Q. "Studies specifically assessing potential movement of talc particles through the human body were not identified in the literature." Are you aware of any such studies that assess the movement of talc particles through the human body?

A. Yes. Indirectly. I mean, and I note in the, you know -- in my section on -- I mean, that -- the fact that talc has been found in ovaries, talc

Page 229

has been found in lymph nodes -- I mean, when you say "study specifically is assessing," if you're talking about study putting a peroneal talc and going up the, you know, vagina, cervix, uterus, no, there is no study like that in humans.

But there are studies which find talc in ovarian tissues, talc in -- which provide indirect evidence of retrograde migration of talc. And the FDA concludes that they -- the findings that potential particles do migrate is indisputable. It's not just me. It's FDA, other researchers as well, Dr. O'Brien as well.

Q. Well, you'd agree that there are animal studies in which talc has not migrated to the ovaries; correct?

A. Yeah.

MS. PARFITT: Objection. Form.

Q. Well, let's look specifically at paragraph -- the following paragraph on page 19. You'd agree that the Henderson study cited here introduced talc into the cervical canal and did not find it in the ovaries of rats; correct?

A. Which Henderson?

MS. PARFITT: '77, '79?

Q. Sorry. 1986. It's the one that's

Page 230

discussed in Paragraph 19.
A. Give me a second. This is an animal study, but it says talc particles were detected in ovaries of all rats that received intrauterine installation as well as rats that received intravaginal treatment -- I mean, all of this was discussed in biologic plausibility last time. And I'm happy to discuss it, but it seems like --
Q. The only thing I want to establish, that you'd agree there are animal studies going both ways on this issue.
A. Yes.
MS. PARFITT: Objection. Asked and answered.
Q. Just wanted to address that very briefly. We may return to Health Canada later today, but I just wanted to address the issue while we were on it. Now I want to turn to Woolen 2022.
MS. PARFITT: Going to Woolen.
MR. MARTIN: Can I introduce both Woolen as Exhibit 26 and a supplemental table to that as Exhibit 27?
(2022 article by Sean A. Woolen, et al., Exhibit 26, marked)
(Supplementary table, Exhibit 27,

Page 231

marked)
Q. So you discussed Woolen in Paragraph 1 on page 5, the first sentence of that page of your report, your 2023 report. "Woolen, et al. conducted a systematic review and meta-analysis of case control and cohort studies and examined the relationship between frequent perineal exposure to talcum powder, defined as multiple applications greater than or equal to two times per week, and the risk of ovarian cancer."
Let's look at this study. Let's look first at the list of authors of this study. Woolen, Lazar, and Rebecca Smith-Bindman. Do you know that Dr. Smith-Bindman is an expert for plaintiffs in this litigation?
A. That has been disclosed, yes.
Q. Yes. And it is, in fact, listed in the conflict of interest at the end. Are you aware that this article grew out of a meta-analysis that she performed for this litigation?
MS. PARFITT: Objection.
A. I have no knowledge --
MS. PARFITT: Misstates the evidence.
A. -- of that meta-analysis.
Q. You agree that that's not mentioned in this

Page 232

paper; right?
MS. PARFITT: Objection.
A. How do I know --
MS. PARFITT: Form.
A. -- if that is even correct? Like, that's not my, you know, determination. I'm looking at the paper disclosures. That's as much as I get into it.
Q. Would you agree it's not disclosed in the paper?
MS. PARFITT: Objection. Misstates the evidence in the case.
A. If it occurred, it could have. I don't know if it occurred; right? I have not looked at her report or previous meta-analysis. I'm just looking at this published peer-reviewed manuscript, her disclosure, and her analysis.
Q. You agree it doesn't say it in this publication.
MS. PARFITT: Objection. Asked and answered.
A. No, it doesn't.
MS. PARFITT: He already answered the question. Move on.
THE WITNESS: Move on.
Q. You've never read Dr. Smith-Bindman's

Page 233

litigation reports?
A. No.
Q. You never talked to her?
A. I don't know her.
Q. Okay. If this article grew out of litigation work, would that affect your view of its reliability?
MS. PARFITT: Objection.
A. I've already evaluated that. And the disclosure is a -- complete. We know that she's, you know, an expert. So, as this question has been answered several times, examine the methodology, acknowledge the funding sources, bias and do that for the same studies for, you know, Lynch and other interpretations and others.
So it's not just you -- you know -- it's okay to -- I mean, I'm not saying it's -- as long as they're disclosed, it makes it easier for the reader to interpret the studies and understand. That's all. And I'm not sure what you mean by the term "grew out of litigation."
Q. We don't have time to go through and compare this to Dr. Smith-Bindman's report. But let's look at the first line of the "background" section here. Let's look at the full "background"

section.
A. "Introduction"?
Q. No. "Background."
A. In the abstract.
Q. In the abstract.
A. Okay.
Q. Okay. "Risk of ovarian cancer in women with frequent perineal talcum powder product is not well understood." Do you agree with that as a starting point?
MS. PARFITT: Objection.
A. I mean, that is her context. There are studies prior to her that suggest that, you know -- increased risk with frequent use, some. So I think the question is, like, you know -- I think it's a context to begin a review.
Q. Okay. And then the final sentence of the "background," "The purpose of this study is to estimate the association between frequent -- at least two times per week -- perineal talcum powder use and ovarian cancer." Do you see that?
A. Yes.
Q. Okay. Would you agree with me generally that the reliability of a meta-analysis is contingent on the selection of studies that it

includes?
A. Why a meta-analysis? A pooled analysis like O'Brien's and any study is dependent on the data they decided to include, the analysis they set up, what was the primary hypothesis. So it's not really either -- Woolen and it's Penninkilampi and everybody.
Q. The reason why a meta-analysis is because we happen to be looking at one right now. So you would agree it's true of meta-analyses, as well as other things.
MS. PARFITT: Objection. Form.
A. Yes.
Q. Can we look at page 2527, the first full paragraph on the second column, "The four prospective."
A. Yeah.
Q. Can you just review that paragraph quickly? Then I'll ask you some questions.
A. Yes.
Q. So I think you may have noted this in your report, but they did not include the pooled analysis in O'Brien. But they did -- correct?
A. Yeah. So they had an etiologic question about, you know, frequent use. And so they

contacted the authors -- actually went a step ahead -- and got the data to conduct their analysis.
Q. I was trying to avoid a compound question. But the second question was they did include some of the data from O'Brien's study that came out of the Nurses' Health Study.
MS. PARFITT: Objection to the characterization of O'Brien.
A. They included the data that was relevant to the question at hand.
Q. Which was some of the data reported in O'Brien.
A. Yes.
Q. Okay. Can we look at page 2529, Table 1?
A. Table 1, yeah.
Q. Okay. What are they doing in this table?
A. They're providing an assessment of -- Table 1; right?
Q. Yes.
A. Quality assessment. Yeah.
Q. Okay. Using the Newcastle-Ottawa scale?
A. Yes.
Q. Is the Newcastle-Ottawa scale objective or subjective?
A. I mean, any assessment is, you know -- is

susceptible to interpretation. But here, too, they've included studies that are, you know, low quality, medium quality, high quality. So obviously, anything is subject to interpretation.
And we can go through the questions and say -- for example, the question on the Newcastle -- I'll give you an example why it is subject to interpretation -- is adjusted for most reasonable confounder. So I could say "Well, age or parity." And someone else would say "No. I want age, parity, or oral contraceptive." So that's subject to interpretation.
Q. Dr. Singh, I'd appreciate it. I'm just running short on time. I appreciate if you focus on the question asked.
What study received the highest Newcastle-Ottawa score here?
A. O'Brien.
Q. Okay. Do you agree with the assessment of giving O'Brien a higher quality score than the case control studies?
A. Yes.
Q. Okay.
A. And it also provides a significantly increased risk. Independent of the whole analysis,

Page 238

it reports a 40 percent risk for these.
Q. Again, we'll get to that. Again, I'd appreciate if you just answer the questions.
The -- can you look back at the Taher article that we talked about earlier, Taher 2019?
A. What's the number?
MS. PARFITT: It's number 24.
Q. When you get there, can you look at Table 1, which spans page 89 and 90?
A. Table 2. Yeah.
Q. Table 1 on page 90.
A. Yeah.
Q. Whittemore -- well, first of all, this table also evaluated studies using NOS. That stands for Newcastle-Ottawa score?
A. Sure.
Q. Look at Whittemore, which is maybe a third of the way down on page 90. What's the score there, the Newcastle-Ottawa score they give it?
A. 4.
Q. Let's flip back to the Woolen article. You can see they also GRADE the Whittemore article. Can you see what they gave it there?
A. 7. Yeah.
Q. Okay. Do you know why it was given such a

Page 239

higher rating in Woolen than the Taher article?
MS. PARFITT: Objection. Form.
A. I mean, they provide the reasons, you know, selection, comparatively, and outcome -- exposure; right? And that adds up to 7.
Q. Okay. Can you look at Wu, the Newcastle-Ottawa score in that one in Woolen?
A. Yes.
Q. It's an 8?
A. Yeah.
Q. Can we flip back to Taher and --
MS. PARFITT: Again, the page?
MR. MARTIN: Page 90, again.
Q. What did they give that same article?
A. 7.
Q. Okay.
A. So, I mean, those ratings, as we discussed -- I was trying to explain -- and more important is the analysis, which excluded the low-quality studies, particularly Booth. And then even after they excluded Whittemore, their estimates did not change.
So I think this issue of rating is important. But perhaps even more important is addressing what happens when you exclude the low-

Page 240

quality studies, which they've done. So yes, rating you can have -- I don't know if, you know, if I went through what Taher did, I don't know if I would exactly replicate their ratings. It may be 1 point above or 1 point below.
Q. That was my next question. Have you attempted to grade the qualities of the studies on which you rely using the Newcastle-Ottawa scale?
MS. PARFITT: Objection. That question was asked several hours ago, quantitative --
A. No. I did not do a Newcastle qualitative because several of -- for example, if you go to Penninkilampi, they graded all the studies are high quality. So they didn't exclude any studies.
Q. Let's move to Table 2.
A. Of Taher --
Q. Of Woolen. You can put Taher away. We can do that exercise for several more studies but --
A. This is done?
Q. Yes. We're done with that. Table 2, Footnote 5.
A. Yeah.
Q. So you see that Dr. O'Brien provided additional data that are included only in the supplementary tables; right?

Page 241

MS. PARFITT: Let's read what it says. Let's read it into the record.
Q. "O'Brien did not publish on daily exposure for the National Health study participants. However, these data were available, and O'Brien provided these data for inclusion. The entirety of these data were provided and are shared in the supplementary table. We include data on women with intact fallopian tubes to harmonize with other publications."
MS. PARFITT: Thank you.
Q. Can we look at Supplemental Table 1, which is in the next exhibit?
A. Yes.
Q. So you can see here that, as the footnote suggested, there are data for all women and data for women with patent fallopian tubes; right?
A. That is correct.
Q. Okay. In both cases, they're broken down into nonusers, less frequent users, and daily users; right?
A. That is correct.
Q. And so Woolen could have used the "daily user" category among all women, which would have had somewhere around 1200 ovarian cancer cases; right?

Page 242

MS. PARFITT: Objection to form.
A. Where is that number?
Q. I'm adding 706 plus 302 plus 216.
A. Yeah.
Q. Instead, they used, as we discussed, the women with patent fallopian tubes; right?
A. That's correct.
Q. Okay. And both -- looking at daily users, you'd agree that the both crude and adjusted hazard ratios for daily users are higher among women with patent fallopian tubes; right?
A. That is what O'Brien reported.
Q. Okay. And so by using the women with patent fallop -- by using data only from women with patent fallopian tubes, Woolen used a number that was a higher risk ratio; right?
MS. PARFITT: Objection to the form. Misstates what Woolen did.
A. Yeah. I mean, they selected what, you know -- based on the question about frequency, they selected one of the ratios that they felt was etiologically relevant -- not felt, but --
Q. They selected the higher of the two available odds ratios.
MS. PARFITT: Objection. Misstates.

Page 243

A. That was what was available.
Q. So the answer is yes?
MS. PARFITT: Objection.
A. They selected the data that was etiologically relevant to the question at hand.
Q. It is the higher of the two odds ratios; correct?
MS. PARFITT: Objection. He's answered the question. Please.
Q. Let's look back at that table.
A. Same table?
Q. Same table.
A. Yeah.
Q. Let's look at less frequent users, hazard ratio for all women of 0.96 and a hazard ratio for patent tubes of 1.04. Do you see that? "Less frequent users"?
A. Okay. Yeah.
Q. Okay. You'd agree that, if the next category up was "daily users," some women in the "less frequent users" category would have met the greater-than-twice-a-week inclusion criteria?
MS. PARFITT: Objection. Form.
A. I don't -- I would have to go back and look at how they define this. Give me a second.

Page 244

Q. We don't have time to read all the studies. Let's just strike that question.
A. I didn't really understand that.
Q. Okay. It was not meant to be critical. I was just trying to move on.
A. I tried to understand it too.
Q. So turning back to the Footnote No. 5 in Woolen that we read into the record a moment ago. "We include data on women with intact fallopian tubes to harmonize with other publications."
Can we look at the "methodology" section of the abstract? And can you point me anywhere that references patency in the inclusion criteria?
MS. PARFITT: And you're limiting him just to the abstract? There's a "methods" section on the next page as well.
A. Give me one second. Let me just read it. Yeah. So, I mean, to answer your question, you'd have to go and look at the methods and publication of primary data reporting on multiple times -- I'm at "eligibility criteria and study selection," second paragraph.
Q. Yes.
A. So their criteria were --
MS. PARFITT: Go slowly. She's having a

Page 245

hard time.
A. "Selection criteria included publication of primary data, reporting on multiple times per week -- greater than two times per week -- perineal exposure to talcum powder, including direct application to the perineum, application to underwear or sanitary napkins or on birth control devices like diaphragms, at risk for malignancy.
"And studies were also selected for baseline quality, requiring a multi-value risk adjustment, study-size cancers, and defined researched methods."
Q. Is there anything in what you just said that references patency or tubal ligation?
A. But -- yeah. I mean, it doesn't explicitly mention that. But multi-value risk adjustment, you know -- it doesn't even explicitly mention parity. Doesn't mention oral contraception.
When we do meta-analysis -- and I've done 65 of them -- you have to explicate your inclusion, exclusion. All studies do not have the same confounders they control for. So their etiologic question was more than twice a week. And then once they found that data, they have to choose.
Penninkilampi excluded many studies that,

Page 246

you know, didn't meet the criteria or had different ratios of adjustment. We wouldn't exclude Penninkilampi just because all the studies did not adjust for the same confounder.

Q. I'm asking what I think is a simple question. Do you see anything in the inclusion criteria related to patency or tubal ligation?

MS. PARFITT: Objection. He's answered the question.

A. I see it because I see multi-value adjustment as not explicitly but implicitly looking at the risk factors and -- which includes patency and hysterectomy.

Q. So do you know if the other studies other than O'Brien that are included in this meta-analysis were limited to women with intact genital tracts?

A. Let's discuss the studies. I went and reviewed that.

Q. Okay. We don't have time --

MS. PARFITT: Let him -- you asked a question. Let him --

A. I'll tell you which ones did, which ones didn't. This goes to the -- again, the science is evolving. Some of the newer studies -- for example, Schildkraut did assess for patency. Cramer reported

Page 247

data by patency. Some of the older studies did not.

So, first of all, they have to find the etiologically relevant exposure category. Then if that study reported data adjusting for patency, they harmonize. It they can't harmonize based on patency, the primary question is exposure category.

Q. So, again, the answer to the question is that no, not all of the case control designs were limited to women with patent reproductive tracts?

MS. PARFITT: Objection.

A. Yeah. That is correct. Some studies did not adjust for it, especially the earlier studies did not. But even excluding those earlier, low-quality studies, the ratios are similar.

Q. Again, the answer was yes?

A. Yes. But because the -- that is typical of a meta-analysis; not all studies will have the same multi-value adjustment.

Q. One of the studies they look at is Wu; correct?

A. That is correct.

Q. Okay. And this study is also individually on your reliance list; right?

A. I think I discussed this last time, but I probably may have -- I mean, we can look at it, if

Page 248

you have specific questions.

Q. I appreciate that, and the reason I'm doing that is --

MR. MARTIN: Can we go off the record again?

(A break was taken)

MR. MARTIN: All right. Before the break, we were talking about Woolen and talking about -- one of the studies that is included in the Woolen meta-analysis is a 2008 study by Wu, et al. So I'd like to mark that as the next exhibit.

(2008 article by Anna H. Wu, et al., Exhibit 28, marked)

Q. Let's look at Table 2, which is on page 1411.

A. Yes.

Q. And you can see that frequency and duration of talc use is broken down into several categories.

A. Sure.

Q. The first is -- well, the first is less than 20 years -- excuse me -- less than or equal to 20 years and less than or equal to 10 times a month. We'd all agree that that does not qualify for the selection criteria in Woolen; right?

A. That is correct.

Page 249

Q. Okay. The next one is less than or equal to 20 years and between 10 and 30 times a month.

A. So it would be twice a week and --

Q. Does that qualify for the selection criteria in Woolen?

A. It's one of the estimates that qualify. There are others.

Q. Let's go to the -- what is the RR for that one?

A. 16 -- 1.16 and 0.63 and 2.12.

Q. So there are others. Let's go to the next one, less than 20 years and greater than 30 times a month. That qualifies as well; right?

A. That is correct.

Q. And next one doesn't qualify -- right -- greater than 20 years but less than or equal to 10 times a month?

A. That is correct.

Q. Greater than 20 years and between 10 and 30 times a month?

A. That is correct.

Q. Does that qualify?

A. Which one? Second-to-last; right?

Q. Second to last.

A. Greater than 20 years, greater than ten --

Page 250

yes. If it is greater than 10, yes.
Q. What's the risk ratio for that one?
A. 1.57, .99 to 2.5.
Q. In the final category here, greater than 20 years and greater than 30 times a month, that one qualifies?
A. That is correct.
Q. Okay.
A. And that is the one they selected.
Q. You've preempted several of my questions, but yes. The -- and that is the only one in which the confidence interval does not cross 1 of the various categories here. Do you agree with that?
A. Yes.
Q. Okay. And that is the only one that Woolen selected; correct?
A. Yeah. And again, you know, this goes back to the question. What is the question at hand? Because meta-analysis -- Woolen, me, others, Penninkilampi -- we have to make analytic choices. When they say twice, you know -- more than twice a week, that is a -- they are looking at any -- my understanding is they are looking at any etiologic relevant human exposure levels. So that's one.
The second point is -- and I'll -- let me

Page 251

explain this. So, yes, these are eligible. They select one. The second is, even, you know, if you look at their meta-analysis forest plot, you will see that the boxes for Woolen are -- the confidence intervals are Y. It's a very small black box. The biggest boxes are for NHS 2020 and Cramer.
So what -- again, that goes to the issue: What is driving the estimates? It's Cramer and O'Brien. So if -- even if they had selected, you know -- say they selected a category, 1.57, this would have only a minimal influence on their meta-analytic estimate. And they further went ahead and excluded Wu -- Wu, which they note in their -- you know, in the results, when excluding Wu, et al., which combined perineal administration of talc with other methods, the summary pool ratio was 1.44, 95 percent CI, 29 -- 1.29 to 1.6.
So what this means is all analysts have to make a choice. When I do a meta-analysis, I'm comparing X drug to B. Sometimes there will be two arms. I have to make a choice. And they made -- you're right. They selected the highest dose. But that was etiologically relevant to human exposure. And Wu is not contributing significant weight to this analysis. Even if they chose -- went down, it

Page 252

still will only be slightly attenuated.
Q. Let's unpack that a little bit. So first of all, you'd agree with me they could have included all four estimates that met their inclusion criteria?
MS. PARFITT: Objection. Misstates the testimony.
A. How could they have included all four? I don't understand. Just because there are four categories? Is that the understanding?
Q. Well, each of those categories represents a different set of women; correct?
A. No.
MS. PARFITT: Objection. Form.
A. You cannot -- I'll explain why. Let me explain. Yeah. I mean, if they wanted, they could have, you know, done analysis by each category. But you never -- you would never include, like, Wu A, B, C, D, four different categories in one analysis because there is correlation, you know. All these studies are -- data are coming from the same analysis. You can't pool them together.
You have to select -- so they could have done -- and we've talked that -- say 1.57 is relevant. They could have done that. But my answer

Page 253

is that it wouldn't have -- they couldn't have pooled all of them in that same analysis.
Q. Let's turn back to Wu -- to Table 2 in Wu.
A. Sure.
Q. And let's take, for example, the two qualifying subsets for greater than 20 years.
A. Yeah.
Q. You see that? So the first one has 51 cases, 43 controls. Second one has 67 cases and 45 controls. They couldn't have pooled those two numbers together and done 117 cases and 98 controls?
A. No. The reason is -- if you go to the footnote -- one adjusted for race, ethnic -- so these are the hazard ratios or adjusted hazard ratios.
So, you know, within a study, if -- you try to pool, you know, your sort of correlated data. Across studies, you can pool from -- but within that study what could have, you know -- one approach would have been look at different categories of exposure, you know, in the main meta-analysis, not pool these two categories together in that main meta-analysis.
Q. They could have asked Dr. Wu for the underlying data.

Page 254

MS. PARFITT: Objection. Form.
A. I don't -- yeah.
Q. Could they have asked Dr. Wu for the underlying data?
MS. PARFITT: Objection. Form.
A. I mean, I don't know if that was the approach they took. They were approaching it one study. They want to look at one exposure category. I don't think they were trying to disaggregate exposure categories.
Q. Well, they did ask Dr. O'Brien for her underlying data.
A. Yeah. Because -- they asked her because she did not report it. Did not report it by that exposure category. Here, they already reported. They chose one. If they had gone one step further and said "I'm not sure that Dr. Wu would have" -- they would have to give primary data. Then each of them would have to be adjusted to be included in that analysis. But looking at this table, you could not include that.
Q. Let's -- okay.
A. No. I do this for a living, I mean.
Q. Let's look back at the -- let's look back at the Woolen forest plot. And when you mentioned

Page 255

the forest plot, you mean Figure 2 on page 2530?
A. That is correct.
Q. Okay. And just so I understand your opinion -- your basis for saying that Cramer and O'Brien are the most important studies -- no. I'm sorry.
MS. PARFITT: Objection.
Q. Let me -- for saying that Cramer and O'Brien contribute the most to the pooled estimate is the size of the black box?
A. No. Yeah. That is because that is a reflection of the underlying weight of the meta-analysis, but it's not only that. You can get even more precise because you can look at the difference in the confidence interval.
For example, if you look at Wu, you're talking about 1.34 to 3.23. So that's a wide, you know, confidence interval as reflected in the, you know, small box as well as -- but if you look at Cramer, you see it's 78 minus 20. That would be .58 difference. If you look at O'Brien, it's 1.68 minus 17. So it's a little more than that.
So that's how weighting occurs. So the ones that have wider confidence intervals are contributing less weight, even though this is, as I

Page 256

understand, a random meta-analysis. So the weight is being driven by these larger studies with precise confidence intervals. I would have liked to see weights. You know, when I do the meta-analysis, I report weights.
Q. And by "weights," you mean a quantitative assignment to each study?
A. Exactly. How much weight was this in the analysis.
Q. Okay.
A. But I can tell you, looking at it, doing this all the time, that that's what it is.
Q. Can we turn back to the PDQ?
A. Sure.
Q. It is Exhibit 7, just for your reference.
A. I got to find it now.
Q. Unsurprisingly, I'm going to ask you to turn to the perineal talc exposure section of the PDQ.
A. Let me find it. I'm going to find it. What is it? 7?
Q. Exhibit 7.
A. Got it. What is the page number for that?
Q. It is not paginated.
A. Okay.

Page 257

Q. It's towards the end.
A. Endometriosis -- hormonal replacement therapy, blah, blah, blah. Where is talc?
Q. Two pages behind that.
A. Got it.
Q. Okay. Thank you. Can we look at the second paragraph of perineal talc exposure and particularly the sentence beginning "A meta-analysis of ten case control studies"?
A. Yes.
Q. Okay. "A meta-analysis of 10 case control studies and a highly selected subset analysis of one prospective cohort study found an association -- OR 1.47, 95 percent confidence interval, 1.31 to 1.65 -- among women who used perineal talc at least twice a week." And you see that the -- that is to Citation 10, which is the Woolen study; right?
A. That is correct.
Q. Okay. And you understand the highly selected subset analysis of one prospective cohort study to refer to the subset of O'Brien they used?
A. That is correct.
Q. Okay. Next sentence, "The subset analysis of the prospective study was inconsistent with the main finding of the initial report." Do you agree

Page 258

with that statement?
A. No. And let me explain why. So, you know, the first statement is just statement of results and includes -- talks about O'Brien.
The second statement is "The subset was inconsistent with the main findings of the original report." Well, the subset analysis of the prospective study was the only one which actually provided data on frequency by more than two times per week. The original analysis provided data -- they define "frequency" as weekly. So you can't compare twice a week versus weekly.
So, you know, there's, like, apples to oranges. O'Brien did not provide this data at the time of the publication. So this is a different set of data. So what are they comparing? When they say "The subset analysis of this prospective study was inconsistent with the main" -- I mean, this whole -- this issue is about frequency. And the frequency as defined here is twice a week, which was not the analysis in O'Brien.
Q. So let me ask two questions to follow up on that. You said in your answer, I believe, that the subset used in the Woolen meta-analysis was the only one that satisfied the frequency inclusion criteria.

Page 259

A. Two of them. Sister did. And Sister had -- you know, they provided that Sister had, like, what, two cases.
Q. I'm sorry. Yes. That's true. But -- that is true. But in addition, Dr. O'Brien provided the all-women data that also met the inclusion criteria; right?
A. Which one? Where did you see that?
MS. PARFITT: Let's go back to that.
Q. The all-women data we talked about earlier as opposed to the women with intact tubes data?
A. Yes. Yes. Yeah. But -- let me clarify. I don't think that this interpretation, Reference 11, when they're talking about -- I think they are referring to -- they have -- I don't think this refers to that table of the Woolen report.
I think this refers to the subset analysis of the prospective cohort study was inconsistent with the main findings of the original report, which is when they go back to O'Brien.
Q. Right.
A. But O'Brien's frequency is weekly. So how are you going to compare?
Q. I was simply asking a follow-up question to something you said in your answer.

Page 260

Do you know what percentage of the O'Brien sample was ultimately included in Woolen?
A. I didn't calculate the percentage. I mean, whatever the sample was, you know, frequency was relevant.
Q. Can we turn back to your report?
A. Page?
Q. 6. Final full paragraph, starting about half to two thirds of the way through that paragraph, "Among the five."
A. Final -- Woolen?
Q. No. It's page 6.
A. Okay. 6. Yeah. My report, new report?
Q. Of your new report?
A. Yeah. Go ahead.
Q. Okay. "Among the five cohort studies included in Health Canada's review, they reported no statistically significant associations between genital talcum powder use and risk of epithelial ovarian cancer. But the majority of cohort studies also reported an elevated risk consistent with the case control studies." By "elevated risk," do you mean a point estimate above 1.0?
A. That is correct.
Q. Okay. Do you consider any point estimate

Page 261

above 1.0 to represent an elevated risk?
MS. PARFITT: Objection. Asked and answered many hours ago exhaustively.
A. I think we had this discussion. Is it 1.2, 1.3? I don't have -- you know, I think I sort of take an opinion on what the American Statistical Association has said. It's really explained in detail in my previous report.
Q. You're on the editorial board of two new journals since your previous report, Frontiers in Drug Safety and Frontiers in Primary Care and Family Medicine.
A. That is correct.
Q. Do you know if those journals require submissions of P values or confidence intervals?
A. All journals require.
Q. Okay.
A. Submission does not mean, you know -- they also require cautious interpretation. And so submission of P-values is -- what does that P-value mean? And P-values are just a statement that your data -- the probability of obtaining data as a more extreme when your null hypothesis is true.
Q. Just to be clear, the answer to my question is yes, they do?

Page 262

A. Yes.
Q. Can we turn back to Health Canada?
A. Which one is that? 25.
MS. PARFITT: Absolutely. Right.
Q. Let's look at the biological plausibility discussion in Health Canada. Which is on page --
MR. MARTIN: Can we go off the record for a moment.
(A break was taken)
MR. MARTIN: Back on the record.
Q. Do you see the final -- well, do you see the final paragraph of that section, the second of two, "Collectively, there is significant exposure information lacking to permit a fulsome assessment of biological gradient"?
A. Yes. But in the Taher report, they already provided the studies that provide evidence of, you know --
Q. So do you agree --
MS. PARFITT: Wait. Wait. Please let him finish.
Q. I apologize.
A. That is why my weight on dose response was, you know, was qualified. It doesn't mean there cannot be an assessment. You have -- in fact, if

Page 263

one had not performed a fulsome assessment, then I would not -- you know, I think that report should not -- you know, report would be improper because you have to perform -- so there is enough data to perform an assessment. But whether you have a gradient or not, you have to explain.
You know, there are some studies that provide exposure response based on how these are measured, other studies that don't. So I think this sentence is not incompatible with their own, you know, report -- I mean, in the study.
Q. I'd like to move to the previous paragraph and, in particular, draw your attention to several of the citations there, particularly in the first parenthetical, Ballman 2019, Diette 2019, and -- in the last large parenthetical -- Moorman 2018, Siemiatycki 2018, Singh 2018, Smith-Bindman 2018, Wolf 2018. Do you know what those citations are?
A. Yeah. They are citations to expert reports in previous -- some of them. I mean, I don't know if all of them are. Seems like it is.
Q. That is correct. Are you -- is it typical in scientific literature to cite litigation expert reports?
MS. PARFITT: Objection. Form.

Page 264

A. I will provide you examples. I mean, if you look at a tobacco litigation, that has produced hundreds of manuscripts. If you look at the opioid litigation, there's an archive at UCSF that has produced at least -- I wouldn't say "hundreds."
So, you know, I would recommend that J&J come to agreement with -- whenever this matter is settled to make these documents available. And I'm happy to facilitate that. Exactly.
Q. My question is not related to confidentiality. My question is have you in your academic work cited litigation reports as support for -- as scientific support?
MS. PARFITT: Objection. Different question.
A. Not me personally. You asked is there -- you know, the first question prior to that -- maybe you can read that -- the question.
Q. I agree. It's a different question. It is a different question.
A. You asked, you know, "Are there citations to litigation?" And I provided you many examples: Vioxx, of, you know, tobacco, of opioids. So as long as -- you know, again, you have to evaluate. Both reports were considered.

Page 265

Q. So can you answer the question that I asked?
A. Me? No, I have not. No. But, you know, in this report I have. In my report I have.
Q. Correct. But in your academic work you have not.
A. No.
Q. Can we turn to page 17?
MS. PARFITT: Health Canada?
MR. MARTIN: Health Canada.
A. Okay. Health Canada. Yeah. I'm there.
Q. Second half of the page.
A. Yes.
Q. Second sentence of the second-to-last paragraph, "There are a number of different tumor types with characteristic histological (verbatim) features, distinctive molecular signatures, and disease trajectories. Moreover, these tumors are heterogeneous and can arise from different tissues of the female reproductive tract, including the fallopian tube epithelium."
Do you agree that different subtypes of ovarian cancers have different molecular signatures?
A. Right. I'm not a molecular scientist. I know that different -- what I know is that different

Page 266

types of epithelial ovarian cancer can arise. For example, endometrioid can arise from different; clear-cell can arise from different; mesotheliomas can arise from different; you know, serous ovarian cancers can arise from different.

I don't know what they mean by "molecular signatures." I don't really understand. That's not my area of expertise.

Q. Can we turn to page 45 of Health Canada?

A. Yes.

Q. Final sentence of the first paragraph -- this is sort of where they sum things up -- "While there may not be consensus within the scientific community regarding the" --

MS. PARFITT: One second.

A. Where is that? Page 45; right?

Q. Yes.

A. Final sentence of the --

Q. First paragraph.

MS. PARFITT: Up here.

A. Okay. Yeah. Go ahead.

Q. "While there may not be consensus within the scientific community regarding the interpretation of the epidemiological information, after weighing the available lines of evidence, the

Page 267

assessment determined that the current data are indicative of a causal effect." Is that sentence consistent with your conclusion?

A. Yes.

Q. Do you agree that there is not consensus within the scientific community?

MS. PARFITT: Objection. Form.

A. Well, that's what they, you know, interpreted. But after reviewing the whole body of evidence, they conclude and I conclude that the current data are indicative. There's, you know, different scientific consensus about lots of different things. But that's what they state.

Q. Understood. I'm just trying to get your opinion on the state of scientific opinion. Do you believe there's a scientific consensus about these issues?

A. The scientific -- I don't really -- I mean, you know, everybody has their opinions. I think that -- why make it specific to talc and ovarian cancer? It could be talc and endometrial cancer. I think that's not relevant to causality.

I mean, talc and -- you know, if it's smoking, a lung cancer -- obviously, it's not to that level. But, you know, there is enough

Page 268

established scientific consensus. I mean, you look at the OCAC consortiums. You look at, you know, the studies published.

So it's like "What is the threshold" when you say there's scientific consensus. How many scientists do you need? Hundred? Five hundred? We've had 30 studies. Do you need a hundred? I don't know. I don't have a level when I can say there's scientific consensus.

Q. Are you aware of any -- are you aware of any regulator in the United States that has found talc -- peroneal talc use to constitute -- cause ovarian cancer?

MS. PARFITT: Objection. Form.

A. Yes.

Q. Which one?

A. The EPA.

Q. Is that --

A. Not -- yeah. EPA. The recent update.

Q. Your opinion is that this document represents the EPA's opinion that talc use causes ovarian cancer?

A. Yes.

Q. Okay.

A. And we can read that if you want.

Page 269

Q. We have 12 minutes left. I don't think we can.

A. You asked a question.

Q. I understand.

A. Got to get it in the record.

Q. Let's talk about Fletcher 2019. We have to mark it.

MR. MARTIN: It's Harper, Harper 2019.

MS. PARFITT: As we're going on the track here, final track, you're picking up speed. She is going to be losing speed. We'll have a disconnect here. You're fired up.

THE WITNESS: I'm trying to --

MS. PARFITT: I know. It's hard for her to get your words.

(2019 article by Amy K. Harper, et al., Exhibit 29, marked)

Q. This is published in a journal called Edizioni Minerva Medica. Do you see that?

A. Yes.

Q. Prior to including this article in your expert report, had you ever heard of that journal?

A. Actually, I've heard of the Minerva journals. I don't know about this Edizioni Minerva Medica, but I know about the Minerva group of

Page 270

journals. I don't know specifically this journal.
Q. Can we look at the final page?
A. Okay.
Q. "Funding" section, "A portion of Ghassan M. Saed's time conducting this research was paid for by the lawyers representing plaintiffs in the talcum powder litigation." We've talked about this a lot. That doesn't affect your view of the reliability of the article?
MS. PARFITT: Objection.
A. You know, to the extent that I talked about it, I didn't say that it doesn't. I said it's an issue of interpretation. Obviously, I have to look at the methods. And, you know, I'm aware that they were the authors in this.
Q. Can we look back on the first page in the abstract? Do you see where it says "72 hours of treatment"?
A. Yes.
Q. Okay. And do you see where it says that "exposure to talcum powder induces malignant transformation" in the "conclusion" section?
A. In the abstract?
Q. In the "conclusion" section of the abstract. Yes.

Page 271

A. Yes.
Q. Okay. Does 72 hours strike you as a short period of time in which to observe malignant transformation?
MS. PARFITT: Objection. Form.
A. Yeah. So, again, I'm not, you know -- I can interpret the studies. And I have, you know, looked at them. And they are -- experiments seem reasonable. And whether these occur -- malignant transformations occur in 72 hours or takes 400 hours, I don't know that. I mean, it seems, you know, reasonable on the surface. And I relied on that to make my assessment.
Q. But it's not your area of expertise?
A. Yeah. I wouldn't say that this, you know -- how long does it take to induce malignant transformation.
Q. I just want to do some final housekeeping the last few minutes. Can you look at your new reliance list at the end of your 2023 report?
A. Yeah.
Q. Okay.
A. Which is which page? Yeah.
Q. Are the 75 articles on this reliance list everything that you -- do the 75 articles on this

Page 272

reliance list reflect everything that you relied upon in the drafting of your 2023 report?
A. Drafting, yes. But then I have subsequently reviewed other things that was provided to -- you know, since November.
Q. Those were the documents that were provided to us on Monday?
A. Yeah.
Q. Okay. Is every document that you have reviewed in forming your opinions included in one of the following three places: The 2019 reliance list -- excuse me -- the 2018 reliance list, the 2023 reliance list, and the documents produced on Monday?
A. Yeah. I cannot think of any other document.
Q. Can we return to the Narod paper very briefly?
A. Which is number?
Q. That is -- I can give you an unmarked copy if you can't find it.
MS. PARFITT: It's 22.
A. It's probably there somewhere.
Q. Do you mind just referencing my copy?
MS. PARFITT: I've got it right here.
Q. Great. Thank you. Can you look at the

Page 273

last paragraph?
A. Taher or Narod?
Q. Narod.
MS. PARFITT: I'm sorry.
Q. I got it here. Can you just look at the last paragraph there?
A. Last -- second page, last paragraph?
Q. Second page, last paragraph. Do you see the third sentence, "I don't think we should try to ascribe any particular case of ovarian cancer to prior talc use"? See that sentence?
A. Yes.
Q. Do you agree with that sentence?
A. I mean, just --
MS. PARFITT: Objection to the form. Please go ahead.
A. Just prior to that, they say "In the interest of public health, I believe we should caution women against using genital talcum powder." But then they, you know -- so I -- that, to me, means that they're ascribing risk to genital talcum powder so -- but then they get into this particular case -- any particular case.
So that would depend on how you -- what is in that case, what is the age, what is the sex, what

Page 274

is oral contraceptive use, what is the family history, what is the genetic markers.
I mean, blanket, you cannot say that -- this case. But I think someone with more experience as a gynecologic oncologist could look at the data and can ascribe or can refute that. This does not occur.
Q. So you don't agree with that sentence?
A. Yeah.
Q. As a --
A. I don't think we should to ascribe -- I think they are -- you know, they should have been much more nuanced in this, that this requires contextual considerations.
Q. Do you know who any of the bellwether plaintiffs in the federal MDL are?
A. No.
Q. Do you know who any of the trial plaintiffs in the New Jersey MCL are?
A. I don't know.
Q. The New Jersey state court proceedings.
A. No, I don't. I don't think so.
Q. You're not offering an opinion on the causation of any individual person's ovarian cancer?
A. No. That's not my area of expertise.

Page 275

Q. You don't intend to do so in this litigation?
A. No. That's not my area of expertise.
MR. MARTIN: Can we go off the record? I'll review my notes.
(A break was taken)
MR. MARTIN: Back on the record. Nothing further from me at this point, Dr. Singh.
THE WITNESS: Thank you.
MS. PARFITT: Dr. Singh, I just have a few questions as part of the follow-up.
EXAMINATION
BY MS. PARFITT:
Q. Dr. Singh, you were asked questions within the last hour with regard to any regulatory body here in the United States that has addressed the issue of asbestos in talc and ovarian cancer. Do you remember that series of questions?
A. That is correct.
Q. All right. And I believe you referenced the EPA; is that correct?
A. That is correct.
Q. Let me show you what we will have marked as Exhibit No. 30.
("EPA Asbestos Part 1; chrysotile asbestos; regulation of certain conditions of use under the Toxic Substance Control Act, TSCA," document, Exhibit 30, marked)

Page 276

Q. It's entitled "EPA Asbestos Part 1; chrysotile asbestos; regulation of certain conditions of use under the Toxic Substance Control Act, TSCA." Do you see that?
A. Yes.
Q. The agency is the Environmental Protection Agency. Do you see?
A. Yes.
Q. You see it says "Final rule" at the top?
A. Yes.
Q. Okay. Want you to turn first to the summary. I'm going to reference a couple of sections here. Go to the summary on page 1.
A. That is correct.
Q. It states "The Environmental Protection Agency -- EPA or the agency -- is issuing this final rule under the Toxic Substance Control Act to address to the extent necessary the unreasonable risk of injury to health presented by chrysotile asbestos based on the risks posed by certain conditions of use.
"The injuries to human health include

Page 277

mesothelioma and lung, ovarian, laryngeal cancers resulting from chronic inhalation exposure to chrysotile asbestos."
Is this the -- one of the sections of the EPA report that you were referring to earlier when counsel asked you what you were relying on for purposes of your opinion that the EPA had made a final rule regarding causation and asbestos and talc?
MR. MARTIN: Objection.
A. No. Yeah. That was one of the segments but sort of another pertinent section is on page 14.
Q. Tell us about that.
A. The last -- at the bottom of page 14 we have -- so the first one you presented is summary. Talks about asbestos as a cause of, you know, risk factors, various cancers including mesothelioma, lung, and ovarian.
But here at the end of page 14, the EPA says, additionally, some talc deposits and articles containing talc have been shown to contain asbestos. Thus, EPA recognizes that use of talc may present the potential for asbestos exposure.
Q. What significance, if any, does that have to your opinions in this case?

Page 278

A. Well, it's, you know -- my opinions are -- overall causal opinion is that, you know, talc is -- talc is causally related to development of ovarian cancer, not predicated on -- necessarily on the basis of asbestos. But now, more and more evidence is emerging such as -- you know, this was published after I submitted my report -- that further enhances the evidence on biologic plausibility segment on -- as one more further in the chain of evidence about talc and ovarian cancer.

Q. All right. If you would turn as well to page 20 of the report.

A. My report?

Q. The EPA report.

A. Okay. Yes.

Q. Subsection 1, it's called "Description of unreasonable risk."

A. Yes.

Q. If you would read -- let me just ask the question -- read to yourself the first half of that paragraph?

A. Yes. "The health endpoint driving EPA's assessment" -- "determination" -- I'm sorry -- "of unreasonable risk for chrysotile asbestos under the conditions of use is cancer from inhalation

Page 279

exposure. Unreasonable risk includes the risk of mesothelioma and lung, ovarian, and laryngeal cancers from chronic inhalation exposure."

Q. Similarly, what, if any, significance do you attach to that ruling by the EPA as to the opinions you've given in this case?

A. Yeah. So, as I stated in my earlier report in '18, that this is one other, you know, one -- another pathway -- a plausible pathway. If talc contaminated with asbestos is inhaled, that may be another potential pathway by which there's an increased causal risk of ovarian cancer.

Q. Okay. And lastly, if you'll turn to page 92 and 93 of the EPA report that you've referenced earlier as a source supporting your statement that a governmental regulatory agency has opined on these issues. If you go to the bottom of that page, if you will.

A. Yes.

Q. Bottom of 92, it starts "EPA believes that the benefits" -- "EPA believes the benefits of removing chrysotile asbestos, a known human carcinogen that causes cancer, mesothelioma, lung, ovarian, and laryngeal cancer, from continued use in the United States are significant enough to outweigh

Page 280

the potential additional exposure to PFAS that might result from this action."

Do you have an opinion to a reasonable degree of scientific certainty that indeed chrysotile asbestos is a known human carcinogen that causes mesothelioma, lung, ovarian, and laryngeal cancers?

A. I mean, I think that is indisputable, that, you know, asbestos is a carcinogen and specifically for ovarian cancer. I mean, you know, did I do the causal assessment? No. But IARC has done it. EPA has done it. Others have found it. I would say the fact that asbestos is an ovarian carcinogen is, you know -- as we were talking about scientific consensus, I mean, that is beyond dispute.

Q. And your opinions today with regard to talcum powder, do they consider the fact -- are they based upon the fact that talc contains asbestos?

A. Yeah. I mean, as I noted in my report -- earlier report that, you know, studies have described that, you know, investigators have found and FDA has found and testing by Drs. Longo and others have found the presence, that talc, you know, contains asbestos.

Q. But your opinion in this case is that

Page 281

talcum powder can cause ovarian cancer based upon the fact that talc can contain asbestos or may not contain asbestos; correct?

A. Yeah. My causal opinion is, you know, I -- to the extent I did, I mirrored that I'm not predicating my opinion on the presence of asbestos. But I'm, you know -- there are studies that -- and I cited those studies. But now with the EPA ruling and -- it is becoming more and more likely that that is one more pathway that, you know, is suggesting causal risk between talc and ovarian cancer.

Q. All right, Dr. Singh. You were -- let me show you, if I will, Exhibit No. 24, the Tanha article entitled "Investigation on factors associated with ovarian cancer: An umbrella review of systematic review and meta-analysis." That was --

MR. MARTIN: Which exhibit is this? I'm sorry.

MS. PARFITT: Exhibit 24.

Q. Let's pull yours here. Tanha?

A. That's the umbrella review?

Q. Yes. Here we go? Let me show you Exhibit No. 24, Tanha. If I can direct your attention, please, to page 15 of 17. Let me know when you get

Page 282

there.
A. Yes.
Q. All right. You'll recall that counsel asked you a question with regard to whether or not you agreed or disagreed with the statement that states "The ovarian carcinogenesis mechanism of perineal talc use has remained unclear." Do you remember being asked that question?
A. Yes.
Q. What counsel did not read to you is the following: "Based on a hypothesis, however, as an external stimulus, talc can ascend from the vagina to the uterine tubes and trigger a chronic inflammatory response, further promoting the OC" -- ovarian cancer -- "development, cellular injuries, and oxidative stress, and local elevation of inflammatory mediators -- for example, cytokines and prostaglandins -- could be mutagenic, thus encouraging carcinogenesis." Do you agree or disagree with that statement?
A. Yeah. And I have cited a slight different version in my testimony about Dr. O'Brien providing exactly -- if it's a slight difference on nuance, you know -- the same suggestion of mechanism of carcinogenesis.

Page 283

Q. Let me show you that. I'm not sure it was marked. It's Ogunsina and O'Brien.
MS. PARFITT: If it was not marked, we'll mark it as Exhibit 31.
(Article by Kemi Ogunsina, M.D., et al., Exhibit 31, marked)
MR. MARTIN: Do you have a copy of it?
MS. PARFITT: We do. I think we have three.
Q. Let me show you what we've marked Exhibit 31. It's the Ogunsina and Dr. Katie O'Brien article and some others.
A. Yeah.
Q. You referenced in speaking about the Tanha article that -- the position that the Tanha editors had taken as it relates to how talc can migrate and cause this chronic inflammatory response, promoting these cellular injuries, oxidative stress, and local reason of inflammatory mediators. What is the position of the O'Brien and Ogunsina article with regard to that same opinion?
A. They cannot be more explicit than they are here in page 1 -- 665 E1: "Talc is a poorly soluble particle" --
MR. MARTIN: What page?

Page 284

A. It's the first page, "introduction." "Introduction," third column, third line, "Talc is a poorly soluble particle. And animal models have shown that, once deposited onto epithelial cells, it can cause chronic inflammation, leading to a series of mutagenic events" -- exactly the same that we were seeing in the other -- "and this effect is worse in talc contaminated with asbestos, a known carcinogen" and the cite reference 19, which is the IARC working group.
Not only that, you know, we had a discussion earlier about "Well, you know, there's no evidence of migration in Health Canada." But that is not entirely correct, because if you look at page 22 of -- going to page 22 of --
Q. Health Canada?
A. -- Health Canada, the first paragraph they discuss the studies. And they say that "This lends support to the idea that externally applied talc can migrate from the perineal and, therefore, the Johnson study." So it's not that Health Canada is saying it cannot migrate.
MR. MARTIN: Was this produced to us on Monday?
MS. PARFITT: It was.

Page 285

MR. MARTIN: I do not see it anywhere.
MS. PARFITT: Should be in the Dropbox.
A. The Health Canada, I'm sure, is there.
MS. PARFITT: What I'd like to do next is have marked as Exhibit No. 32 an article entitled "The association between douching, genital talc use, and the risk of prevalent and incident cervical cancer" by Katie O'Brien, Weinberg, D'Aloisio -- D-a-l-o-i-s-i-o -- Moore, and Sandler. Counsel, here's a copy.
(Article by Katie M. O'Brien, et al., Exhibit 32, marked)
Q. All right, Dr. Singh. Is Exhibit 32 an article that you've previously reviewed for purposes of your opinions in this case?
A. Yes.
Q. Okay. And what, if any, significance does this article, O'Brien, Sandler, et al., have on your opinions of your -- excuse me -- talcum powder exposure can cause ovarian cancer?
A. So if you go to the second page of the article, 2211114836, they are write in the top just above the methods, "Genital talc use could also plausibly contribute to cervical cancer risk. Talc applied to underwear, sanitary napkins, diaphragms,

Page 286

directly" -- "can enter the vagina and travel up the reproductive tract. Talc particles may act as irritants, inciting an inflammatory response and potentially affect individuals' susceptibility and response to HPV. Additionally, more severe effects" --

Q. Excuse me. You missed a word.

A. "Or more severe effects could occur" --

Q. I'm sorry. You missed another word. Just so the record's correct, did you say "adverse"?

A. Yeah. "Adverse affects could occur through the talc containing asbestos, a known carcinogen sometimes mined in the same locations."

Q. Continue.

A. And the epidemiological literature supports a possible positive association between genital talc use and ovarian cancer, in which they cite their own study without any qualification about patent or nonpatent tubes. So that's -- Reference 35 is O'Brien, et al., the pooled analysis we've been discussing.

Q. The 2020 article?

A. Yes.

Q. I believe I asked you what the significance, if any, of this article was to your

Page 287

opinions.

A. Yeah. The significance is, first of all, Dr. O'Brien, you know -- I was shown an article. She talks about an experimental model. She has in multiple places, you know, mechanisms and models of how talc migrates, causes -- we're talking about migration, inflammation, contamination with asbestos causing -- she has a real outline of the model.

She couldn't have described it better than myself and also interprets her own article without any qualification for patent tubes as a possible positive association.

MS. PARFITT: I don't have any further questions, subject to counsel.

MR. MARTIN: Let me just review a couple of things. I'll see if I have another question.

(A break was taken)

MR. MARTIN: Back on the record.

Q. Can I direct your attention to Ogunsina, Exhibit 31?

MR. MARTIN: And I do just want to put on the record that, as a result of a syncing error, that was not produced to us on Monday. So I have read it during a break.

Q. The outcome of interest in that study is

Page 288

fibroids; correct?

A. Yes.

Q. It does not evaluate the relationship -- it does not directly evaluate the relationship between genital talc use and cancer; correct?

A. Yeah. And this is a contextual study. And partly why I looked at it and -- I looked at it was I was interested in Dr. O'Brien's interpretation of statistical significance. In fact, one of his other studies, which was the Sister Study in which he thought -- you know, she interprets positive associations for hazard ratios that are not significant, you know, the update of the Sister Study by Chang.

So I wanted to -- I was interested in how does she think about other cancers. So here, I see, you know -- in fact, this goes to uterine fibroids. There's knowing that -- it is not specific to talc and ovarian cancer. But it provides context. That's all.

Q. It does not measure cancer outcomes.

A. No.

Q. Okay. Can we look at the EPA document, Exhibit 30, and can we look at the first page?

A. Page?

Page 289

Q. Page 1, title. Do you see where it says "Asbestos Part 1; chrysotile asbestos; regulation of certain conditions of use"?

A. Yeah.

Q. Okay. Can we flip down to page 15? And I think this might be a -- excuse me -- the end of page 14. I think this might be a passage that you read with Michelle earlier. Let me know when you're there.

MS. PARFITT: Bottom of 14.

A. Yes.

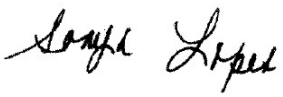
Q. And I think this is the passage that you read: "Additionally, some talc deposits and articles containing talc has been shown to contain asbestos. The EPA recommends that certain uses of talc may present the potential for asbestos exposure. Where EPA identifies reasonably available information demonstrating the presence of asbestos in talc and where such talc applications fall under Toxic Substances Control Act authority, those applications of asbestos-containing talc conditions will be evaluated in Part 2 of the risk evaluation for asbestos."

So would you agree with me this Part 1 of the risk evaluation was not focused on talc that may

contain asbestos?
MS. PARFITT: Objection. Form.
A. No. They, you know -- they say they'll do future evaluations. But they also say that talc, you know, as they state here -- some talc deposits and particles containing talc have been shown to contain asbestos.
Q. Would you agree with me that exposure to talcum powder was not the focus of this portion of the EPA's review?
A. No.
MS. PARFITT: Objection.
Q. You would not agree with that?
A. No. I'm saying that this EPA review is focusing on asbestos and ovarian cancer and noting when that talc can occur. But they're not specifically looking at peroneal talc and cosmetic talc.
MR. MARTIN: I don't have anything further.
MS. PARFITT: Nothing. Thank you very much. We would ask to read and sign.
(Deposition concluded at 5:45 p.m.)

REPORTER'S CERTIFICATE

I, SONYA LOPES, Registered Professional Reporter and Notary Public in and for the Commonwealth of Massachusetts, certify;
That the foregoing proceedings were taken before me at the time and place therein set forth, at which time the witness was properly identified and put under oath by me;
That the testimony of the witness, the questions propounded, and all objections and statements made at the time of the examination were recorded stenographically by me and were thereafter transcribed;
That the foregoing is a true and correct transcript of my shorthand notes so taken.
I further certify that I am not a relative or employee of any attorney of the parties, nor financially interested in the action.
I declare under penalty of perjury that the foregoing is true and correct.
April, 2024.



Sonya Lopes
Notary Public
My Commission Expires:
October 28, 2027

WITNESS: Sonal Sing, M.D., M.P.H [Volume I]
DATE: April 4, 2024
CASE: IN RE JOHNSON & JOHNSON TALCUM POWDER PRODUCTS MARKETING, SALES PRACTICES, AND PRODUCTS LIABILITY LITIGATION

DISTRIBUTION TO COUNSEL The original signature page/errata sheet was sent to Michelle A. Parfitt, Esq., to obtain signature from the deponent. When signed, please send original to Zachary W. Martin, Esq., who will supply a copy of the signed errata sheet to other counsel present at the deposition.

WITNESS INSTRUCTIONS After reading the transcript of your deposition, please note any change or correction and the reason for it on the errata sheet. DO NOT make any notations on the transcript itself. Use additional sheets if necessary.

SIGN AND DATE THE ERRATA SHEET under the pains and penalties of perjury and return it, along with the transcript, to your counsel.

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY

IN RE JOHNSON & JOHNSON TALCUM POWDER PRODUCTS MARKETING, SALES PRACTICES, AND PRODUCTS LIABILITY LITIGATION — MDL NO. 16-2738(MAS)(RLS)

I, SONAL SINGH, M.D., M.P.H., do hereby certify, under the pains and penalties of perjury, that the foregoing testimony is true and accurate, to the best of my knowledge and belief, with the addition of the following changes/corrections:

Page/ Line/ Change/Correction
____/____/_____
____/____/_____
____/____/_____
____/____/_____
____/____/_____
____/____/_____
____/____/_____
____/____/_____
____/____/_____

WITNESS MY HAND, this day of , 2024.

_____
SONAL SINGH, M.D., M.P.H

Cc: Zachary W. Martin, Esq.

&

& 1:6 2:3,19 8:7,10 19:8 48:7 68:23 292:3 293:2

0

0 220:7
0.0. 220:14
0.05 213:15
0.33 212:23,25
0.33. 213:3
0.63 193:3 249:10
0.96 149:13 243:15
0.99 161:13
0.99. 189:18
001 220:6
01605 1:21
02116 2:22
049 214:5
05 165:2 192:9
051 214:4

1

1 4:10 6:19 9:7 18:17 48:19 49:25 56:23 63:1 123:2 131:19 134:18 141:20 147:8 148:19 150:8 153:23 155:14 165:4 209:20 220:22,25,25 221:1,4,13,14 231:2 236:14 236:15,18 238:9,11 240:4 240:5 241:12 250:12 275:25 276:4,16 278:16 283:23 289:1,2,24
1,258 157:2
1-293 1:1
1-32 1:2
1.0 128:5,10 143:4 211:18 260:23 261:1
1.0. 142:5,9,13 150:1,4 210:20
1.01 144:16 146:5,9 148:19 149:25 171:9
1.01. 145:21
1.03 147:15
1.04. 243:16
1.05 149:11,13 150:4 192:23
1.08 161:12,16 162:4,17
1.09 147:2 150:20 162:14 176:17 218:6
1.09. 162:23
1.1 176:14,17
1.1. 181:19
1.13 171:9
1.16 149:13 249:10
1.16. 149:11
1.17 218:8
1.17. 141:5
1.19 147:15
1.2 181:16,18 182:19 261:4
1.2. 178:20
1.22 209:19
1.23. 147:2
1.242 220:5
1.25 189:16 223:3
1.25. 144:16 190:12
1.250 220:15
1.26 171:9
1.27 218:6
1.279 220:4
1.29 251:17
1.29. 192:10
1.297. 220:13
1.3 261:5
1.3. 181:20
1.31 257:14
1.32. 147:10
1.33 127:24 130:24
1.33. 131:16
1.34 255:17
1.355 220:5
1.36 209:23
1.37. 147:15
1.42 131:14 218:7
1.44 251:16
1.47 257:14
1.48. 218:6
1.5 171:10
1.57 250:3 251:10 252:24
1.6. 251:17
1.65 257:14
1.68 255:21
1.72. 218:8
10 4:23 23:3 44:22,23 52:8 52:10 56:22 118:9,10 144:23 145:7 146:2 149:20 163:3 165:13 196:19 224:9 224:11 248:22 249:2,16,19 250:1 257:11 257:17
101 124:19,23
104 5:9
11 5:4 44:22,23 47:21 57:7,9 59:13 161:4,12 164:9 168:15 176:18 177:1 184:17,21 259:14
11353 291:23
117 5:11 253:11
12 5:6 85:18 86:17 106:7,23 127:9,9 144:23 145:10 146:2

155:4 269:1
12.4 155:5 161:1
1200 241:25
124 221:8
127 5:13
13 5:8 30:11 43:23 44:1 52:7 68:19 104:2,4 129:14 144:23 145:7 146:2 221:1
13,000 186:22
13,421 177:5 184:25 185:20
133 5:15 127:24
138 5:17
14 4:11 5:10 43:25 44:1 52:12 74:18 110:14 111:18 117:12,15 220:10 277:12 277:14,19 289:7,10
1411 248:15
15 5:12 20:17 42:17 57:6 127:3,6 137:3,3 165:13 173:17 226:13 281:25 289:5
15,000 142:19
15th 14:25
16 4:19 5:14 28:24 35:1 42:7 43:15 133:8,10 137:1 159:19 159:21 160:3,5 249:10
16-2738 1:8 293:3
1660 207:20
1663 209:3 212:10 217:19 218:1
1665 209:17,18
1667 214:15 215:19
17 5:16 66:12 121:11 138:5,7 255:22 265:8 281:25
17.4 155:16
170 5:21
1734 122:1
179 5:23
17th 291:22
18 4:12 5:18 122:1 127:15 127:17 128:1 131:2,3,5 154:8 279:8
1800 150:25
1825 2:5
1835 118:6
1837 123:3
1843 118:19
1844 121:21
187 5:25
19 5:20 13:1 29:6 169:25 170:2 196:4,15 227:21 228:3,9 228:10 229:19 230:1 284:9
191 6:5
194 126:18
196 137:15
1986 229:25
19th 61:18,22

2

2 4:11 5:4 13:23 14:1 56:23 57:8 63:1 66:12 133:24 134:1 137:4 140:15 150:8 179:18 179:20 180:9 191:18,22 196:1 197:8 198:19 201:3 220:10,12 221:17 238:10 240:15,20 248:14 253:3 255:1 289:22
2,000 179:3 187:5,6
2,168 150:25 177:8
2.12. 249:10
2.5. 250:3
20 5:22 121:11 144:21,25 145:3 165:14 179:14,16 194:9 216:12 216:12 248:21 248:22 249:2 249:12,16,19 249:25 250:4 253:6 255:20 278:12
20,000 98:9
200,000 16:13 178:19,22 179:9 180:1,21 182:19,20 183:3 184:14
2000 157:7
20006 2:6
2006 204:11
2008 6:15 248:10,12
2013 61:10,14 156:16 193:18
2014 52:15
2016 5:12,22 23:4 91:16 117:24 118:10 126:16,19 127:2 132:17 135:3 178:9 179:15 188:13 188:16,21,25
2018 5:18,24 13:1 16:1 35:1 61:25 64:3 65:6 65:7 66:4 76:14 76:14,15 77:15 154:5,7,21 155:8 163:22

187:17,22,25 188:10,14,15 188:18 199:10 219:4 223:16 263:16,17,17 263:17,18 272:12
2019 4:19 5:10 6:4,17 12:7 14:17 15:24 16:2,3 25:2,4,8 25:11 26:16 28:22 29:8,15 30:6,18 42:7,18 61:13 66:3 68:12 70:18,22 85:12 117:12 117:14,20 126:8,20 137:16 191:11 191:12 238:5 263:15,15 269:6,8,16 272:11
202.783.6400 2:7
2020 5:16,20 51:22 83:23,24 84:20 136:23 138:3,6 153:21 169:16 170:1 251:6 286:22
2021 5:6 6:6,8 6:10 37:20 86:16,20 206:25 207:4 219:15,18 227:14
2022 6:12 18:20 20:19 37:20 230:18,23
2023 5:4,8 14:25 16:20 43:15 57:8 61:14,25 62:7 64:15 65:5,10 66:4,20 77:1,25 78:20 80:5 83:13 102:23 102:25 103:4,8 104:1,3 115:12 117:18 126:24 159:14 176:24 184:18 190:20 191:15 223:16 231:4 271:20 272:2,12
2024 1:18 5:14 14:4 48:10 133:6,7,12 291:22 292:2 293:19
2027 291:25
207 6:7
2097 166:23
21 5:24 67:1 106:10,19 187:21,23 216:24,25
216 242:3
2168 142:17
219 6:9
22 6:4 48:12,15 191:10,13 198:9,18 199:4 212:18 272:21 284:15,15
2211114836 285:22
227 6:11
23 6:6 49:9 80:3 83:22 102:24 161:6,7 176:20 176:21 207:5
230 6:13,14
23rd 61:19
24 6:8 134:25 177:5 184:24 185:20 219:19 238:7 281:13 281:20,24
247 221:6
248 6:16
25 6:10 42:11 59:14 216:25 227:15 262:3
252 140:6
2527 235:14
2529 236:14
253 188:2,7
2530 255:1
26 6:12 25:7 124:10 230:21 230:24
26.2 123:18 125:17
269 6:18
27 6:14 85:8,14 106:8,19,24 230:22,25
275 4:7
276 6:24
28 6:15 25:13 106:12 108:24 109:13 248:13 291:25
283 7:5 59:9
285 7:7
29 6:17 26:24 83:14,16 84:20 251:17 269:17
29,000 15:6
297 220:5
2a 204:22
2b 204:21

3

3 4:12 18:9 19:19 48:19 79:11 81:10 135:13 144:5,6 147:1 150:8 158:24 194:18 209:17 219:25 220:22
3,000 186:21
3.1. 196:3
3.23. 255:17
3.8 140:14 142:15 143:24
30 6:19 16:23 48:19 131:15

170:6 216:10 249:2,12,19 250:5 268:7 275:24 276:3 288:24
30,000 32:3 33:1,14
30.7 123:12,15 125:16
302 242:3
307 156:24
31 4:13 7:4 283:4,6,11 287:20
310 124:19,23
316 2:13
32 7:6 212:13 285:5,12,13
33 29:1,6 106:13 108:25 109:13
337 137:17
338 137:18
341 127:22 128:15,17
35 286:19
350 206:3
35202 2:14
36 212:15,18
36.5 124:10
363 1:20
37 4:16
376 104:13
38.1 223:5
38.11 220:15
383 105:13,18 105:19 110:22
39 91:15

4

4 1:18 4:13 30:25 31:1 62:6 62:7 98:21 135:13 149:3 191:24 194:16 201:19 238:20 292:2
4.1 98:23
4.4 200:18,18
4.4. 200:20
40 15:1 157:13 238:1
400 190:2 271:10
41 4:18
42 15:8
429 154:25 189:6,13,25
43 253:9
43,000 15:8
440 124:18
45 15:1,6 253:9 266:9,16
47 4:22 156:22 157:8
48 156:22 157:8
49 154:21

5

5 4:14 34:16,18 61:8,9 135:13 149:18 191:15 221:8 231:3 240:21 244:7
50 153:7,9 155:4,8,9,10 198:7
500 2:21
51 253:8
52 4:24 71:6 164:16
53 140:16,20
541 124:18
55 144:5
56 166:1,8,12
57 152:2
58 151:23 153:8 255:20
5:45 290:23

6

6 4:16 37:11,12 219:20,25 220:22,24 260:8,12,13
6.6 160:19
600 13:1
617.573.4862 2:23
62 84:14
63 196:4,13,15 209:6
65 245:20
650 13:3,4 15:6
659 155:16
66 209:5
665 283:23
67 253:9

7

7 4:17 21:1,11 21:12 22:17,21 22:21 41:9,13 41:16 43:2 62:25 74:21 178:13,13 219:20 238:24 239:5,15 256:15,21,22
70 198:7
70,000 15:10
700 2:5
706 242:3
72 59:10 270:17 271:2,10
745 140:6
75 271:24,25
76 147:10
77 84:16,16 229:24
78 255:20
79 229:24
796 52:11

8

8 4:6,19 22:17 41:9 42:8 74:20 88:18,22 89:3 158:24 207:6 207:13 221:5 239:9
80 131:21
81 182:10

82 128:1 131:1 134:16 144:16
85 192:9
850.435.7000 2:15
86 5:7 171:10
89 238:9

9

9 4:10,21 41:11 47:21,23 131:19 207:6 207:13 214:24 215:1,15
90 238:9,11,18 239:13
91 196:3,9,12
92 86:11 279:14 279:20
93 191:23 279:14
94 42:9,10
940 190:2
943 189:14
95 141:20 142:4 220:5 251:16 257:14
96 149:11
97 52:12 147:2
98 130:19 200:19 253:11
99 128:21 130:12,19 134:15,16 141:5 161:17 171:10 172:21 172:21 190:12 191:1 202:17 250:3
991 176:13
9:03 1:18

a

a.f. 118:21
a.m. 1:18
aa 209:8 211:9 216:8
aaces 76:12 216:3,9
aaces's 216:14
able 70:12 76:24 195:3
above 240:5 260:23 261:1 285:23
absence 196:19
absolute 97:22
absolutely 262:4
abstract 140:3 234:4,5 244:12 244:15 270:17 270:23,25
academic 25:17 26:5 27:6 63:11 264:12 265:5
accepted 188:16,21
access 57:16,23 163:11
accompanied 169:18 225:1,7 225:22
accordance 122:1
account 43:20 127:16
accurate 293:6
accurately 104:9 128:20 169:12,14
ace 95:25
achieve 179:19 179:23 180:14 180:18
acknowledge 117:2,4,7 233:13
acknowledged 69:4 168:21
acknowledg... 121:22 122:5
acog 4:16 37:12
acog's 38:8
act 6:23 276:2,7 276:20 286:2 289:20
action 280:2 291:19
active 21:25 22:1,9
activities 19:20
actual 42:13
actually 19:17 37:16 41:11 42:4 60:3 64:20 92:6 93:5 136:24 143:15 157:5 165:25 166:6 196:25 197:19 200:13 200:16 218:19 236:1 258:8 269:23
add 158:22 181:24 223:19
added 153:20 160:12,14
adding 181:3 181:13 185:1 223:20 242:3
addition 180:22 259:5 293:7
additional 10:10 11:9 50:10 65:9 78:22 81:18 153:16,17 240:24 280:1 292:19
additionally 277:20 286:5 289:13
address 29:8 158:11 199:4 217:11 230:15 230:17 276:21
addressed 113:24 275:16
addressing 127:22 128:18 239:25
adds 239:5

adequately 187:9
adjust 90:21 135:14 186:7 246:4 247:12
adjusted 96:25 126:10 131:13 144:11,15 147:7 157:9,11 158:1,4,11,17 237:8 242:9 253:13,14 254:19
adjusting 157:12 167:24 247:4
adjustment 125:5 135:19 163:10 182:24 245:11,16 246:2,11 247:18
adjustments 150:13
administration 251:15
admitted 32:10 53:22 57:17
advance 9:17 12:5 77:25
adverse 286:10 286:11
advertisement 121:25 122:7 122:23
advised 77:16
affect 100:2 135:3 208:4 233:6 270:8 286:4
affects 286:11
affirm 109:12
affirmatively 40:9
african 208:20 208:25 209:12 209:19 210:3 210:17 211:15 212:17
afternoon 46:19 205:21
age 49:14,17,21 49:24,24 110:14 131:13 146:2 157:11 237:9,10 273:25
agency 276:9 276:10,19,19 279:16
ages 144:23 145:7 164:5,6
aggravated 227:6
aging 21:18
ago 69:21 149:24 240:10 244:8 261:3
agree 28:7 34:9 36:20 38:4,23 39:2,21 44:9,17 45:2 46:8 48:17 48:22 49:15,23 50:3 52:21 53:25 54:4,23 54:24 65:18 66:20 89:14 90:4 91:18 92:18 93:17 95:2 98:2 99:3 99:5,22 104:25 120:5 121:19 124:13 126:7 134:19 136:15 138:18 139:4 139:11 141:6 141:19 142:3,7 142:11 146:8 148:14 149:12 150:18 152:8 152:25 164:13 167:2 170:15 170:20 171:14 175:17,19,21 176:4 178:22 182:13 195:2 197:18 200:24 201:25 204:4,8 208:23 209:12 213:12 216:19 217:13 220:16 221:12 223:13 226:17,19 229:13,19 230:10 231:25 232:8,17 234:9 234:23 235:10 237:19 242:9 243:19 248:23 250:13 252:3 257:25 262:19 264:19 265:22 267:5 273:13 274:8 282:19 289:24 290:8 290:13
agreed 157:22 282:5
agreement 264:7
agrees 92:23
ahead 68:15 108:6 236:1 251:12 260:15 266:21 273:16
al 5:7,9,11,13 5:15,17,25 6:5 6:7,9,13,16,18 7:5,7 74:22 83:18 85:10 86:17 104:2 117:15 127:3 127:15 133:8 133:10 138:7 161:24 177:7 178:18 187:22 191:10,13 207:5 219:18 220:1 230:23 231:4 248:10 248:12 251:14 269:16 283:5 285:11,18

286:20
alcohol 131:23 132:2
allen 118:23,24 119:3,18 120:3
american 4:21 36:19,25 47:22 47:24 50:16,22 50:25 51:4 161:15 208:21 208:25 209:13 209:19 210:3 210:17 211:15 212:17 261:6
amount 112:2 200:14
amphibole 75:1
amy 6:17 269:16
analyses 26:10 26:11 157:9 165:5,6,16 183:21 184:1 221:18,22 235:10
analysis 44:24 44:25,25 45:1,7 45:8,14,15,17 45:23,24 46:3 46:13,22 53:23 54:1 65:5,9,21 65:24 81:16,16 84:5,11 85:7,7 85:23 100:3,4 101:25 125:4 127:24 128:19 133:11 134:24 135:8,13,15,17 136:16 143:12 143:19 145:23 157:7,10,15 158:6 159:6 160:13 163:6,8 165:13,13,14 165:19,24 166:14,25 167:13 168:8 168:23 172:2 174:18 178:25 181:1 185:8 188:10,23 189:5,12,15,17 190:2,9,10,24 191:6 193:5,7 193:22 198:3,8 199:8 200:22 211:25 218:17 221:16,23,24 226:1 231:5,19 231:24 232:14 232:16 234:24 235:2,2,4,8,22 236:2 237:25 239:19 245:19 246:15 247:17 248:10 250:19 251:3,19,25 252:17,19,22 253:2,21,23 254:20 255:13 256:1,4,9 257:8 257:11,12,20 257:23 258:7 258:10,17,21 258:24 259:17 281:16 286:20
analysts 251:18
analytic 250:20 251:12
analyze 136:13
angle 17:18
animal 62:15 92:7,8,18 93:2 93:18,21 204:25 227:2 229:13 230:2 230:10 284:3
anna 6:15 248:12
annually 98:10
answer 9:1,5 17:15,16,19,21 18:4 30:17 33:21 42:18 45:21 47:3 56:18 59:21 61:20 68:13 71:8,9 74:2 75:12 77:10 84:15 89:24 91:4 97:7 116:7 121:6 122:12 139:18 142:2 142:24 143:2 148:10 150:11 163:23 165:12 169:9,10 198:13 206:12 238:3 243:2 244:18 247:7 247:15 252:25 258:23 259:25 261:24 265:1
answered 46:1 46:24 71:24 75:5 97:11,14 112:14 116:9 148:18 149:16 151:18 163:22 174:6 208:7 230:14 232:20 232:22 233:12 243:8 246:8 261:3
answering 215:10
answers 8:20 8:24 59:22
anticancer 32:18
anticipated 81:3
anyway 9:2
apologize 37:16 39:18 92:13 103:6 127:5 146:25 153:9 195:25 262:22
appear 165:18 210:12
appearances 2:1 3:1
appears 54:11 74:4 182:11

appendix 79:18 80:1,5,22 83:13 83:16 86:11 113:12,18
apples 258:13
application 194:16 245:6,6
applications 148:1 195:3 217:11 231:8 289:19,21
applied 43:22 44:2 54:11 60:6 105:9 206:6,8 227:2 284:19 285:25
applies 193:10
apply 60:2,22 60:23 145:8 199:22
applying 65:3
appraised 64:23,23,24
appreciate 70:11 97:5 110:24 126:25 142:22,23 237:13,14 238:3 248:2
approach 53:24 54:5 62:8,10 63:16,17,19,21 63:25 65:3 253:19 254:7
approaches 63:20
approaching 254:7
appropriate 67:4 74:3,4 85:6 147:25 162:9,10 178:6 190:23 194:23 217:11 222:7 222:10,11,12
approximate 71:5,7
approximately 14:23 15:6,8 16:16 17:9 20:14 25:3 32:21 78:4 112:8
approximations 71:6
april 1:18 6:10 21:20 227:14 291:22 292:2
archive 264:4
area 68:11 72:12 73:19 95:1 105:10 170:13 171:13 174:20 266:8 271:14 274:25 275:3
argument 56:9
arms 251:21
arps 2:19
arriving 66:9
artery 32:16
article 5:6,8,10 5:12,14,16,24 6:4,6,8,12,15 6:17 7:4,6 24:12 25:25 55:2 80:17,21 80:24 81:4 82:19 86:16 88:9 98:22 100:21 101:24 102:8 104:1,3 104:15 109:16 112:20,21 113:4,6,12 116:3 117:14 118:10,14 121:23,24 122:3 123:1 126:19 127:2 129:17 130:2,3 130:8 133:7,17 133:20 138:6 138:25 140:21 178:8 179:13 180:3 182:18 182:23 187:22 187:24 191:12 193:12 205:12 207:4,20 214:16 219:18 220:17 222:1 224:4 230:23 231:19 233:5 238:5,21,22 239:1,14 248:12 269:16 269:21 270:9 281:14 283:5 283:12,15,20 285:5,11,14,18 285:22 286:22 286:25 287:3 287:10
articles 23:14 24:7,9,24 25:19 25:24 79:13,16 79:24 81:18,24 81:25 83:3 87:9 103:13 113:13 120:12 226:24 271:24,25 277:20 289:14
asbestos 6:19 6:20 24:6 25:1 29:10 30:9 68:3 68:5,8 69:1,7 72:5,13,22 73:13,23 75:21 76:3,22 93:11 227:6 275:17 275:25 276:1,4 276:5,23 277:3 277:8,16,21,23 278:5,24 279:10,22 280:5,9,13,18 280:24 281:2,3 281:6 284:8 286:12 287:7 289:2,2,15,16 289:18,21,23 290:1,7,15

ascend 282:12
ascertain 217:10,15
ascertainment 49:3,5
ascribe 273:10 274:6,11
ascribing 273:21
ashcraft 2:3
ashcraftlaw.c... 2:8
aside 51:10 110:19 114:4
asked 17:3 21:7 24:9,21 34:25 37:4 45:22,25 46:23 55:16 65:14,15 71:23 75:4 77:15 79:5 79:7 92:1 97:10 112:13 137:15 141:17 145:5 148:17 149:15 151:17 157:20 163:21 174:5 208:3,6 215:11 215:13 223:25 230:13 232:19 237:15 240:10 246:20 253:24 254:3,13 261:2 264:16,21 265:2 269:3 275:14 277:6 282:4,8 286:24
asking 12:14 17:13 40:12 51:3 71:2 79:4 90:12 125:11 146:5 148:11 181:14 222:2 246:5 259:24
asks 21:12 145:7
aspect 176:12 177:15 194:13
aspects 24:22
assess 132:9,21 168:20 203:14 228:21 246:25
assessed 132:20
assessing 195:23 228:4 228:16,18 229:2
assessment 45:9 47:14 50:20 54:21 56:11 65:1 66:11 67:18,19 67:22,25 75:8 75:11,19 85:5 92:24 160:10 176:13 192:19 192:24 193:10 195:22 206:15 236:17,20,25 237:19 262:14 262:25 263:1,5 267:1 271:13 278:23 280:11
assigned 66:21 202:21
assigning 171:21
assignment 256:7
assigns 200:7
associate 18:18
associated 41:1 41:2 54:13 55:22 94:24 99:20 100:2 105:7 123:21 131:14 211:8 212:12 220:3 224:21 281:15
association 44:10 50:13 55:10 56:1,5 59:23 76:21 81:13 89:10,15 89:21 90:1 91:19 95:3,9 96:18,20 118:2 133:12 135:21 141:13 143:14 145:22 146:6 147:11,15,17 149:14 151:8 161:14,15,18 162:4,16 163:1 167:3,5 171:12 173:24 186:20 192:15 193:13 196:6,17,20 201:11 202:9 203:8 205:18 214:19 215:2 216:17 234:19 257:13 261:7 285:6 286:16 287:12
associations 90:14 91:12 94:22 99:2 149:18 185:15 187:2 260:18 288:12
assume 24:23 47:25 50:15 51:15 91:4 130:12 133:13 189:7
assumed 128:19 170:14
assumes 179:3
assuming 58:13 120:13 134:15
assumption 128:23 129:4 129:23 130:10 130:14,22,23
assumptions 82:16 131:10 134:17,21
atherosclerosis 32:15
attach 279:5
attempted 240:7
attention 59:1 263:13 281:24

287:19
attenuated 134:22 150:19 151:1 252:1
attorney 291:18
attributed 48:23
attrition 109:11 109:11
author 115:21 116:3,16 118:14
authority 289:20
authors 91:5 109:15 112:20 114:5 126:7 134:20 139:12 144:6 161:12 168:21 171:15 207:20,22 210:7 213:12 214:3 231:12 236:1 270:15
available 241:5 242:24 243:1 264:8 266:25 289:17
average 155:16 180:25 182:13 209:14,15
avoid 39:24 40:4 236:3
aware 10:1,5 23:13,16,17,25 37:3 45:22 46:21 48:6 49:4 51:22,25 68:7 88:3 93:21 102:8,16 103:14 119:5,9 121:8,11 126:21 132:10 132:16 139:15 139:19 207:25 222:6 228:21 231:18 268:10 268:10 270:14

b

b 31:2 251:20 252:18
baby 35:3 71:15
back 21:6 24:21 26:15,17 28:24 31:10 34:20 37:16 41:24 42:25 44:7,7 53:15 58:4 61:5 70:12 79:11 80:8,10 83:12 84:20 85:21 86:11 98:20 99:17 101:16 110:12 115:25 117:11 123:24 138:2 154:4,9 154:10 157:19 161:4,9 163:3 164:16 168:15 169:24 175:5 176:18 178:12 183:2 184:11 190:17 192:19 195:10,24,25 195:25 196:2 213:14 215:8 216:21 217:19 219:10 220:22 221:11,17 222:14 238:4 238:21 239:11 243:10,24 244:7 250:17 253:3 254:24 254:24 256:13 259:9,20 260:6 262:2,10 270:16 275:7 287:18
background 233:24,25 234:3,18
balance 163:17
ballman 263:15
ballpark 15:3 16:5
barred 10:6
base 198:6,6
based 23:10 25:19 30:16 42:23 50:15 57:1 62:15 73:24,25 75:8 75:19 89:20 99:15 125:5 173:22,22 182:18 194:23 201:15 202:6,9 203:2 209:16 222:2 242:20 247:5 263:8 276:23 280:18 281:1 282:11
baseline 156:3 245:10
bases 112:11
basing 131:3 212:20 224:2
basis 81:4 255:4 278:5
baylen 2:13
beasley 118:22 118:24 119:3 119:18 120:3
beat 8:25
becoming 49:3 114:15 226:22 281:9
beechwood 1:19
began 108:2
beginning 42:9 74:21 97:18 104:19 105:4 105:14 106:18 111:1,2 128:15 134:1 155:3,7 166:4 188:9 189:3 202:17 257:8

begins 42:15 59:11 166:14 174:17 180:14 209:4
behalf 8:7
belabor 8:19
belief 293:7
believe 11:23 18:11 22:18 26:20 39:22 40:25 43:25 47:6,10 53:1 54:12 55:4,11 55:14 58:1 60:1 61:1 64:14 72:24 87:10 90:13 91:17 97:7 108:4,7 113:25 138:9 145:21,23 146:5 149:12 157:20 167:12 167:18 168:7 169:5 182:3 183:5 190:5 196:21 197:22 202:12 203:25 207:7,16 258:23 267:16 273:18 275:20 286:24
believes 44:9 279:20,21
bellwether 274:15
benefit 96:1
benefits 279:21 279:21
berge 5:25 187:17,22,24 188:9 191:6,14 221:2 222:17 223:14
best 8:23 9:15 65:2 93:6 148:1 293:7
better 49:3,5 73:16,17 82:22 148:5,6 194:6 287:9
beyond 12:20 13:6 21:24 280:15
bias 20:7 85:5 87:14,14,17,18 88:1,2,3 104:9 104:23,25 110:6 111:11 112:1,3 113:2 113:24 114:23 114:25,25 116:15 127:16 127:23 128:18 133:10,21 134:12 135:7 152:23 158:20 176:9 187:7 200:2,4,13 201:5,6 204:25 233:13
biased 87:11,13
biases 87:22
big 181:6
biggest 251:6
binders 47:21 52:7 57:7
bindman 231:13,14 263:17
bindman's 232:25 233:23
biologic 55:23 56:9,10,24 62:25 76:13 93:3 162:24 230:6 278:8
biological 66:22 81:19 89:20,24 89:25 90:7,10 90:13,19 92:10 125:10 262:5 262:15
biology 173:15 173:22
birth 38:25 245:7
bit 13:3,19 23:20 64:4 68:10 106:16 118:16 162:2 177:14 189:22 193:20 204:18 252:2
black 251:5 255:10
blah 228:12,12 228:12 257:3,3 257:3
blanket 274:3
board 23:5,9,12 24:8,17,18 261:9
bodies 64:22
body 45:18 47:13 53:8,11 62:12,13 65:16 66:7,9 75:8 85:21,22 86:18 94:4,9,12,13,16 94:25 104:7,17 116:23 123:2 195:8 199:23 206:1 228:5,19 228:22 267:9 275:15
books 25:8,10
booth 239:20
borderline 36:12
boston 2:22
bot 70:24 76:20
bottle 76:23
bottles 70:25 71:2
bottom 43:6 123:3 137:17 140:24 147:3 184:17 188:15 196:12 277:14 279:17,20 289:10

bound 161:13 161:17
box 79:12 251:5 255:10,19
boxes 251:4,6
boylston 2:21
bradford 53:22 53:25 54:13,16 56:21 62:22 64:5 65:4,9,21 65:24 100:4,21 197:12
break 9:3,5,6 21:5 41:17,20 41:23 58:3 69:8 70:4 83:9,11 98:19,22 115:22,24 117:8,10 138:1 153:11 154:1,3 157:18 169:23 170:4 184:10 184:12 219:6,7 219:9 224:12 248:6,8 262:9 275:6 287:17 287:24
breast 49:15,22 50:4,5 131:13 131:23
brief 219:22
briefly 59:7 109:21 184:9 230:15 272:17
bring 10:10 59:1 60:11 69:23 173:15 195:14 201:10 221:24 222:17
bringing 173:21
brings 15:9
broke 83:14 90:17
broken 36:8 193:23 241:19 248:18
brought 19:14 203:18
buffer 127:16 127:18 131:3
bullet 127:13 191:24 194:2
bullets 127:12

c

c 28:3 252:19
calculate 126:8 126:11 178:4 260:3
calculated 137:7
calculation 185:9,13,16,17 190:11,15,19 191:1,9
calculations 178:5 190:22
call 25:16 27:2 27:21 55:12
called 140:7 269:18 278:16
canada 6:10 45:8 63:16 64:16,20 160:10 203:6 203:20 204:7 205:7,20,23 206:24 226:23 227:7,11,14,21 227:23 228:1 230:16 262:2,6 265:9,10,11 266:9 284:13 284:16,17,21 285:3
canada's 260:17
canadian 205:23
canal 229:21
cancer 4:17,21 12:24 22:6,13 22:13 23:1 29:12,15,19,22 30:5,19,22 31:21 35:5,6,10 35:15,18,21,25 36:4,6,9,12,16 37:5,24 38:10 40:7,19 41:1,2 41:15 42:1,17 44:13 45:4 46:9 47:22,24 48:7 49:15,22 50:5 50:14,16,23 51:4 76:4 84:1 85:11 86:19 89:11,16,22 91:13 93:10 94:24 95:16 96:19,24 97:23 97:25 98:23 99:6,13 100:2 100:11 101:1,6 101:18,22 105:14 106:5 106:12 107:10 107:15,23 108:17,18,21 108:23 109:3 110:7 111:10 111:20,22,23 112:9 113:1,4,5 113:11,22 114:13 117:13 118:3 123:8 131:14,23 132:1 133:11 138:24 141:13 142:16,18 143:11 152:12 152:12 154:25 156:6,7,9,11,25 158:25 162:13 163:7 164:12 167:6 168:13 171:13 173:25 174:20 177:4,7 177:10,16 178:8 179:7 184:23 187:5,6 189:13 190:5 192:8,16,20,25

193:9,11,14
196:19 202:6
203:2,18,22,23
204:3 208:11
214:18 216:8
216:18 220:4
226:1,11
231:10 234:7
234:21 241:25
260:20 266:1
267:21,21,24
268:13,22
273:10 274:24
275:17 278:4
278:10,25
279:12,23,24
280:10 281:1
281:11,15
282:15 285:8
285:20,24
286:17 288:5
288:19,21
290:15
cancers 35:13
36:13 98:9
99:10,16,18,23
105:8 177:17
177:18 245:11
265:23 266:5
277:1,17 279:3
280:7 288:16
candidly 53:21
191:25
capital 199:16
capture 39:7
carcinogen
279:23 280:5,9
280:13 284:9
286:12
carcinogenesis
92:9,19 93:18
94:6 226:15
227:5 282:6,19
282:25
carcinogenic
93:15
carcinogenicity
92:7 94:7,9
205:12
care 23:7
261:11
carries 26:5,6
111:4
carrying
137:17
case 4:24 8:18
8:25 11:13
13:23 14:3,24
20:6 26:25 27:1
27:9,14,15,16
27:19 28:3,8,15
30:1 31:7,18,24
32:13,22 34:22
34:23 35:20
45:19 47:2 49:6
51:13,24 52:9
53:2,7 55:13,20
57:10 61:6,12
74:24 75:3,10
75:24 76:4
81:15 85:22
88:24 89:9
91:11 96:20
98:1,3 117:20
134:8 135:16
136:8 137:6
142:18 156:12
165:19 177:5
181:19 183:12
183:20,21
184:24,25,25
185:6,9,14,20
185:25 186:18
186:25 187:1,4
187:9,11
188:10,24
189:18 190:24
197:5,5,9,24
198:9,19,22,23
199:1,5 209:18
221:22 222:8
222:13 223:11
231:5 232:11
237:20 247:8
257:9,11
260:22 273:10
273:23,23,25
274:4 277:25
279:6 280:25
285:15 292:3
cases 33:18
34:6,10 55:22
57:3 60:21
74:25 79:9 85:5
123:7,15 124:3
124:10,18
126:15 128:20
128:24 130:11
134:16 143:8
148:25 149:5,8
150:19,23,24
150:25 151:2
153:17 155:1
155:16,20,21
156:24 157:24
177:4,6 184:23
185:6,7,18
187:4,5,6,13,15
189:6,6,6,13,14
189:25 190:2,3
190:3,5 209:8
209:11 241:19
241:25 253:9,9
253:11 259:3
catch 130:2
categories
248:18 250:13
252:10,11,19
253:20,22
254:10
category 43:8
43:10 80:18
241:24 243:20
243:21 247:3,6
250:4 251:10
252:17 254:8
254:15
causal 12:15
53:8 56:7,11
62:9 63:2,8,12
63:15 64:4 65:8
65:13 66:6,6,9
75:2,6,11 81:20

162:16 168:10 168:12,12 174:1 176:13 176:17 201:11 201:15 202:9 203:8 204:1,2 205:18,18 225:25 267:2 278:2 279:12 280:11 281:4 281:11

causality 45:9 47:14 50:20 68:4 75:7,19 92:25 193:10 195:22 267:22

causally 32:14 35:4 278:3

causation 55:24 90:2,3 206:15 274:24 277:8

cause 46:9 76:3 97:19 98:14 100:25 202:6 203:2,18,22,23 227:3 268:12 277:16 281:1 283:17 284:5 285:20

causes 35:24 36:3,7 49:1 99:10 101:9,11 101:13,17,18 268:21 279:23 280:6 287:6

causing 287:8

caution 273:19

cautious 261:19

cc 293:25

cdc 50:25 51:1

cell 35:25 36:5 193:2,14 266:3

cells 93:8 284:4

cellular 282:15 283:18

center 33:8

certain 6:21 9:15 24:9 47:19 57:3 60:7,21 63:23 276:1,5 276:23 289:3 289:15

certainly 139:18

certainty 202:21 280:4

certificate 291:1

certify 291:5,17 293:6

cervical 229:21 285:7,24

cervix 229:4

chain 278:9

chance 58:17 133:18 165:18

chang 145:13 288:14

change 12:11 131:17 150:14 239:22 292:16 293:9

changed 150:13 150:16

changes 18:15 227:5 293:7

chapters 199:17

characteristic 265:16

characteristics 108:13 109:12 112:6,18

characterizati... 236:8

characterized 98:24

charge 13:2

charged 13:8

charges 13:7 121:24

charging 13:1

chart 80:11

check 70:15 78:12 118:17

chief 24:17,18

choice 251:19 251:21

choices 183:14 250:20

choose 20:22 245:24

choosing 65:15

chose 135:25 222:23 251:25 254:16

christopher 2:12

chronic 32:20 227:3 277:2 279:3 282:13 283:17 284:5

chrysotile 6:20 275:25 276:5 276:22 277:3 278:24 279:22 280:5 289:2

chu 3:3 41:12

ci 220:5 251:17

circulated 43:1

citation 84:18 91:15 257:17

citations 42:20 70:7 74:1 222:14 263:14 263:18,19 264:21

cite 74:14 75:17 75:18 117:18 131:7 181:16 183:25 263:23 284:9 286:17

cited 47:6 68:22 79:23 82:1,5,7 82:8,10,10 87:2 87:4 91:24 161:3 219:20 222:1 225:18 229:20 264:12 281:8 282:21

cites 216:22,22

citing 178:7 187:17 222:4,5
clarification 58:12
clarify 55:16 122:18 148:13 259:12
class 20:15,19 20:20,23
classification 129:18 131:11 145:12 204:10
classified 128:1 128:21,25 130:12 131:1
classroom 19:20
clause 130:7
clear 18:24 20:9 35:25 36:5 36:11 54:22 67:18 80:20 132:2 140:18 146:4 168:6 172:3 191:25 193:2,13,22 196:20 216:2,5 261:24 266:3
clearly 195:12
cleavage 75:23
clinic 40:12
clinical 19:24 20:21 63:5 214:9
cml 32:20
coates 31:14
coded 200:12
coffee 224:17 225:4,13 226:1 226:3,5,7,8
coherence 67:20
cohort 20:6 45:19 46:22 47:1,3 81:14 88:25 89:9 118:5,5 142:14 152:10 153:1 159:20 160:17 177:9 178:19 178:24 179:7 179:10,25 180:19,20 185:11 187:6 188:11,24 189:4,11,16,19 190:1 197:5,10 197:25 199:5 222:9 231:6 257:13,20 259:18 260:16 260:20
cohorts 142:9 142:12 152:13 153:20 179:1 181:7 182:14 183:3,5,6 184:13
coincided 20:21
colette 6:6 207:4
colleagues 148:23
collect 110:14 111:16,17 146:17
collected 145:25 169:2
collecting 26:12 111:13 156:7,8
collectively 262:13
college 36:19 36:25
column 52:15 52:21 53:16,18 110:19,25 111:1 121:22 134:1,5,6,7 136:1 149:8 164:18 166:4 174:17,18 188:9 215:8,19 215:23,24 217:23,24 226:15 235:15 284:2
columns 80:11 80:12,13
combine 183:22
combined 27:16 251:15
come 50:21 82:18 132:17 181:15 185:2 190:12 206:21 264:7
comes 17:10 24:21 54:15 116:24 206:17
comfortable 58:7
coming 27:8 77:23 142:20 252:21
comma 216:11
comment 92:1 184:13 185:4 186:24 218:15
commented 218:14
commission 291:24
common 28:5 28:14
commonly 106:7,24
commonwealth 291:5
community 19:8 266:14,23 267:6
company 114:9
comparable 41:1 124:23
comparatively 239:4
compare 107:13 109:8 155:12 164:8 211:2 213:8 233:23 258:12

259:23
compared 106:5 131:16 152:10,13 164:12
comparing 109:9 198:22 211:23 251:20 258:16
comparison 165:9
comparisons 165:4
complete 31:3 233:10
completed 22:16 190:24
completely 141:23 172:19 172:20 189:23
components 76:25 94:2,4,9
compound 236:3
comprehensive 28:18 39:5,10 39:13,20 44:5 47:7,10,12
comprise 190:2
comprised 189:5,12
concept 104:22 165:8
concern 152:23 168:24 199:13 223:5
concerning 30:5
concerns 46:16 116:15
conclude 210:7 267:10,10
concluded 141:12 196:5 196:16,19 290:23
concludes 46:9 46:12,16 229:9
concluding 44:3
conclusion 50:19,21 63:15 65:8,13 66:13 75:6 88:20 89:4 92:4 171:10 172:14 196:21 200:5 202:5,9 203:1 205:11 205:16 206:22 213:4,5 226:14 267:3 270:22 270:24
conclusions 63:2,12 69:1 75:2 109:13 112:20
conditions 6:22 85:11 94:24 276:1,6,24 278:25 289:3 289:21
conduct 46:13 65:9 133:2 165:11 236:2
conducted 29:14 42:20 65:4,6 127:23 128:19 134:12 163:5 165:7 199:23 208:16 220:1 231:4
conducting 197:14 270:5
confidence 136:12,17 141:3,20 142:4 142:4,8 143:17 143:22 144:12 146:16,22 149:13 151:6 151:21 191:21 192:9 193:3 197:6,17 201:22 209:20 209:25 210:9 210:13,20,24 211:2,16,19 212:14,20 250:12 251:4 255:15,18,24 256:3 257:14 261:15
confident 202:8 203:7
confidentiality 57:15,22 264:11
confidently 205:17
confined 91:13
confirm 58:2
confirmation 87:18
confirmed 148:24 149:5,8 150:19
confirms 171:10
conflating 189:24
conflict 114:18 121:4 231:18
conflicts 114:6 118:17,19 119:12 121:11
confounder 158:2,5 182:24 200:13 237:9 246:4
confounders 135:14 157:15 158:15 167:25 186:7 245:22
confounding 20:7 94:21 95:3 95:6,10,11,19 96:3,5,6,17,22 96:24 97:1,4 135:16,20 158:19 176:10 187:7 205:1
consensus 266:13,22

267:5,12,16 268:1,5,9 280:15
consider 26:11 47:13,16 95:9 95:10 99:12 100:16 114:20 116:3 121:3,12 121:20 161:16 162:3,17 167:1 174:22 175:24 176:5,9,9 192:14 214:20 218:8,23 260:25 280:17
consideration 21:17 81:23 90:1,2 96:4,4 100:24,25 116:10,13 121:13 126:5
considerations 121:16 135:6 274:14
considered 27:20 95:4,7 102:6 116:8 165:2 166:18 198:7 264:25
considering 167:25
consistence 129:22
consistency 56:23 59:23 67:19 163:2 196:23 197:1,2 197:11,18,20 198:14 211:3
consistent 109:14 121:7 123:20 124:5 167:4 196:21 204:10 211:5 211:16,18 216:16 217:3 260:21 267:3
consistently 55:22
consortium 45:11,11 47:1,1 208:10
consortiums 268:2
constant 28:8 187:3,10
constitute 268:12
consultants 115:2
consultation 78:16
consulted 120:21
consulting 114:9
contact 43:10
contacted 236:1
contain 61:11 68:8 277:21 281:2,3 289:14 290:1,7
containing 76:22 277:21 286:12 289:14 289:21 290:6
contains 68:2 73:23 79:12 86:1 100:11,14 100:16 227:6 280:18,24
contaminated 69:7 279:10 284:8
contamination 287:7
contends 53:24
content 77:9,11
context 62:20 68:14 79:23 82:2,5,10 84:14 84:18 97:6 142:23 143:1,2 146:7 149:17 149:22 160:6 162:10,11,22 162:24 185:11 195:23 200:9 204:19,19,21 214:4,14 234:12,16 288:19
contexts 60:7
contextual 274:14 288:6
contingent 234:25
continue 59:18 174:11 213:19 286:14
continued 279:24
continuing 59:16 221:1,4
contraception 245:18
contraceptive 48:23 164:4 237:11 274:1
contracts 22:17
contradicting 110:17
contrary 54:9 54:10
contrast 216:3 216:9
contribute 55:24 255:9 285:24
contributing 143:18 251:24 255:25
contributor 159:8
control 6:23 20:6 38:25 45:19 47:2 53:7 81:15 85:22 88:25 89:9 91:11 117:20 131:10 134:8 135:16 142:18 177:5 181:19

183:12,20,22 184:24,25 185:6,10,14,20 186:18,25 187:1,4,9,11 188:24 197:10 197:24 198:19 198:22,23 199:1,5 202:23 203:15 221:23 222:9,13 223:11 231:6 237:21 245:7 245:22 247:8 257:9,11 260:22 276:2,6 276:20 289:20
controlled 188:10 189:18 197:5,6
controls 123:18 124:4,11,18 126:15 128:1 128:20 131:1 131:18 134:17 190:4 198:10 209:9,11 253:9 253:10,11
copy 69:25 70:1 70:10,12 103:17,18 138:11 188:3 207:18 221:5 272:19,23 283:7 285:10 292:12
copyright 188:16,18
cornstarch 94:5,12,16
correct 8:12,15 8:16 9:9,13,19 10:9 11:5 15:12 15:20 19:23 23:7,8,11,23 25:7 26:23 36:10,23 37:21 38:7 42:24 43:16,20 46:10 47:8 48:1 50:11 51:14,18 52:24 54:3 58:11,25 59:15 61:14 62:3 76:5 84:5 84:6 86:23 105:2 117:19 117:22 123:8 123:22 124:5 124:11 126:11 132:4 134:10 136:6 140:20 141:2 142:6,10 144:1,4,15 145:15 147:12 147:16 148:25 152:3 153:3,6 155:18 157:3,6 160:21 164:15 166:21 167:7 180:5,23 183:25 184:15 188:20 192:12 208:21 209:2 213:15 225:3 225:11 226:12 229:15,22 232:5 235:23 241:18,22 242:7 243:7 247:11,20,21 248:25 249:14 249:18,21 250:7,16 252:12 255:2 257:18,22 260:24 261:13 263:22 265:5 275:19,21,22 276:17 281:3 284:14 286:10 288:1,5 291:15 291:21
correction 165:14 292:17 293:9
corrections 293:7
correctly 127:25 128:24 130:11 131:1 131:18
correlated 253:17
correlation 252:20
correspondence 28:20,21
corresponding 218:7
cosmetic 68:2 132:3 221:9 290:17
cost 122:19
costs 121:22 122:25
cote 12:1
counsel 10:7 11:1,3,4 13:8 21:9 39:23 40:4 77:9 79:2 277:6 282:3,10 285:9 287:14 292:8 292:13,23
count 29:1 220:20
counterargu... 218:19
couple 18:15 69:20 208:3 276:15 287:15
course 19:21,25 20:2 67:12 75:17 77:17 150:25
court 1:3 4:23 8:21 52:9,21 77:16 129:25 274:21 293:1
covered 57:15 57:21 163:22
covid 25:25 51:1

cramer 5:13 91:16,18 117:24 118:10 118:13,23 119:5,18 121:3 126:15,16,16 126:19 127:2 127:15 128:14 129:23 130:8 130:10 133:21 134:11,21 135:3 136:25 137:1 138:23 162:1 163:18 194:23 246:25 251:6,8 255:4,8 255:20
cramer's 118:25 163:25
creation 18:25
credibility 17:9 18:6
criteria 53:22 53:25 54:8,14 54:17 55:13,19 61:3 64:5 81:8 85:4 96:17 243:22 244:13 244:21,24 245:2 246:1,7 248:24 249:5 252:5 258:25 259:6
criterion 100:3
critical 83:25 84:23,25 244:4
criticism 153:4
criticisms 42:21 43:18 153:1
cross 250:12
crosses 141:20 142:5,9 209:20
crude 242:9
csr 1:24
ctisi 2:16
cumulative 53:11 62:13
current 18:11 18:12 267:1,11
currently 29:23 40:4 92:8,18
curriculum 4:12 18:9
curve 136:14
cut 225:15
cv 18:8,10 21:11 25:6 26:15 29:5 200:17
cycles 156:15
cytokines 282:17

d

d 4:1 5:1 6:1 7:1 135:13 252:19 285:9
d'aloisio 285:8
d.c. 2:6
d.w. 118:23
daily 216:11 241:3,20,23 242:8,10 243:20
dana 5:20 170:1
daniel 5:12 127:2
data 25:20 26:13 44:9 57:2 67:10 80:25 81:12,13,18,25 82:4 84:7,8,10 84:17 85:6 86:1 88:24 89:8 91:11 92:7 94:7 96:12 97:12 101:25 102:3 105:5 112:16 112:16 113:1,3 113:11,21 117:23 118:2 121:14 129:11 129:13 130:16 130:20 131:15 136:4,13 144:16,18 145:25 146:17 153:16,21 156:7,8,14,19 162:22 169:1 173:19 183:13 191:25 192:15 192:20 193:25 200:7 201:2,8 201:11 202:10 203:6 204:13 204:24,25 214:6,7,14 215:14 217:2 218:10,11 235:4 236:2,5,9 236:11 240:24 241:5,6,7,8,16 241:16 242:14 243:4 244:9,20 245:3,24 247:1 247:4 252:21 253:17,25 254:4,12,18 258:9,10,14,16 259:6,10,11 261:22,22 263:4 267:1,11 274:5
date 14:18,24 45:3,5 46:4,6 47:10,15 57:13 292:2,21
dated 291:22
dates 46:2 61:23 62:5 66:3 85:2
daubert 32:10 57:18
davis 6:7 98:12 206:25 207:4 207:13,17,20 208:4 215:19
davis's 216:19
day 291:22 293:19

days 20:21
deals 27:14
decades 53:5,6 197:15
december 29:6 102:25 103:3
decide 47:17 60:20
decided 235:4
decision 38:8 40:13 56:4,12 199:21 201:12 201:14
decisions 199:25
declare 291:20
declared 33:25
declined 48:18 150:23,24
declining 49:8
decrease 135:20 182:11
decreased 48:24 107:24
decreases 113:4
deemed 82:1
defendants 2:25 120:21
defense 72:14 72:21 116:16 116:20
define 62:1,9 82:5 144:19 201:20 243:25 258:11
defined 63:18 144:20,22,25 145:3 146:20 231:8 245:11 258:20
defrayed 121:23 122:20
degree 131:20 132:9,21 280:4
demonstrable 171:11 172:15
demonstrate 195:4
demonstrates 149:13
demonstrating 177:8 289:18
denominator 181:13 183:19
denotes 80:23
department 19:8,9 21:20
depend 273:24
dependent 235:3
depending 88:1
depends 55:25 149:17,21 158:15 194:25 214:4
deponent 292:10
deposed 8:17 19:13 34:12
deposited 284:4
deposition 1:16 4:10 9:7,18,22 10:20 11:14,22 11:25 12:5,6,10 14:4,21 15:11 15:19,24 16:3 18:16 19:22 22:10,19,20 23:4 29:1 31:7 32:10 34:8 37:1 37:5 39:22 41:14 42:1,5,10 42:22 51:23 57:10,12 59:9 64:13 68:12 69:13 75:22 76:1 77:23 79:14 126:20 126:22 133:2 137:16 138:4 184:3 193:21 208:2 290:23 292:13,16
depositions 11:17 58:9 78:23
deposits 277:20 289:13 290:5
derived 102:4
describe 28:2
described 85:21 118:8 280:21 287:9
description 115:19 278:16
design 28:19 81:22 191:2,3 197:12 198:16 198:24 223:22
designed 203:14,16
designs 20:5 28:6,9 44:4 81:14 187:1 197:4 247:8
despite 198:14 198:15 201:2 202:21 203:25 210:4,14
detail 261:8
detailed 106:9 206:4
details 118:8 206:20
detect 143:10 151:8 152:11 177:9,24 178:20 182:19 185:15 187:2 189:16 190:9
detected 230:3
detecting 186:20
determination 56:7 232:6 278:23
determinations 63:8 201:15
determined 267:1

developed 156:5 174:20
development 32:15 204:3 278:3 282:15
devices 245:8
devoted 225:19
diagnosed 107:9,15,22 112:8
diagnoses 106:12 108:21 108:24
diagnosing 49:7
diagnosis 63:7 109:3,4
diaphragms 245:8 285:25
diets 149:19
diette 11:22,23 11:24 263:15
difference 25:14 27:1 84:22,24 101:10 124:14 124:14,24 125:1,11,16 148:22 149:25 150:3,10 171:20,24 172:21 175:21 211:11,20 212:24 214:1 215:2 223:2 225:21 255:15 255:21 282:23
differences 99:2 111:12 171:8 173:11 173:14 198:14 198:15 214:19 214:23
different 17:18 27:7,18 81:22 87:15,22 94:15 101:9,11,13,21 102:8 106:22 108:10 112:3 112:11,12 125:19 132:24 134:20 136:17 136:18,21 144:7 145:4 150:12 163:25 164:1,5,6 165:12 169:12 172:1,10,20 178:25 179:1 181:21 183:22 185:2 189:24 193:9 197:3,4 197:13,14 201:24 205:5 210:8,15 211:24,25 213:21 216:14 218:18,24,25 223:22 226:3 246:1 252:12 252:19 253:20 258:15 264:14 264:19,20 265:15,19,22 265:23,25,25 266:2,3,4,5 267:12,13 282:21
differential 63:6
differently 63:18 88:16 144:20
differs 104:11
difficult 43:14 77:14 139:23
diffraction 73:1
dig 92:2
direct 113:1 159:17 200:3 214:8 245:5 281:24 287:19
direction 109:17
directions 175:9
directly 92:10 286:1 288:4
directness 200:12
disaggregate 76:24 99:19 193:8 254:9
disaggregating 76:21
disagree 38:8 50:15,23 51:3 97:1 98:2,4,5 110:9 112:19 171:15,16 176:3 189:21 189:23 282:20
disagreed 51:1 282:5
disclaimer 43:10 122:2,6,8 122:19
disclose 114:6 120:16,17
disclosed 231:16 232:8 233:18
disclosure 115:9 118:18 119:12 120:12 120:13,14,15 122:5 232:16 233:10
disclosures 208:9 232:7
disconnect 269:12
discuss 8:9 11:2 46:15 132:25 142:14 165:23 184:3 185:21 215:6,14 230:7 246:17 284:18
discussed 113:23 126:21 132:19 135:10 142:17 146:10 180:4 184:2 194:13 230:1,6 231:2 239:17

242:5 247:24
discusses 41:5 113:2 215:17
discussing 98:22 160:9 184:12 286:21
discussion 77:20 78:3,8,10 78:17 90:13 105:21,23 112:25 126:19 127:20,22 151:22 160:6 163:4 166:1 224:9 261:4 262:6 284:12
discussions 77:6,9,12 78:5
disease 26:1 28:5,8,13,15 32:16 95:21 265:18
diseases 28:14 28:14 137:22 224:22
disentangled 225:12
dispute 280:15
distinct 26:8 27:13
distinction 26:2 27:6,9 70:24 82:9,14
distinctions 27:5
distinctive 265:17
distinguish 25:18
distribution 134:14 135:25 136:1,2,3,9 292:8
distributions 136:9,11,14
district 1:3,4 293:1,1
division 18:18 18:25
doctor 9:8 26:22 29:5 159:20
document 6:11 6:24 9:8,11 37:14 42:3,11 42:15,16 43:9 48:7,10 59:10 59:25 60:10 85:20 88:18 117:16 138:9 227:14 268:20 272:9,15 276:3 288:23
documents 9:15,16,23 10:15 62:18,18 78:19,20,22 102:7 264:8 272:6,13
doing 19:5 21:25 114:9 135:7 181:2 185:16 236:16 248:2 256:11
dollars 16:9
door 157:17
dose 60:21,23 61:1 63:1 66:21 67:4,14,14,16 67:21,24 147:23,25 162:25 195:4,8 195:9,23 214:16,20 215:14,21 216:2,5,15,17 217:12,14 251:22 262:23
doses 60:25
douching 85:10 102:10 103:9 105:12 117:12 285:6
dr 11:22,25 12:1 44:25 52:17 53:19,21 54:7,16,24 55:4 59:1 68:16,24 87:8,8 91:5 100:7 118:13 118:25 119:5 119:18 121:3,4 129:23,24 130:10 134:21 138:17,18,23 141:11 142:22 148:23 161:24 162:1 166:24 173:20 177:12 207:19,25 208:13 226:23 229:12 231:14 232:25 233:23 237:13 240:23 253:24 254:3 254:11,17 259:5 275:8,10 275:14 281:12 282:22 283:11 285:13 287:3 288:8
dr.singh. 8:6
drafted 77:1,7 78:2
drafting 77:25 102:14 272:2,3
draw 63:2,12 63:14 75:2 150:4 213:20 213:22 214:12 214:13 263:13
drawing 75:6 82:9 213:15
drawn 112:20
drinking 226:2
drive 75:11
driven 53:23 54:1 143:21 256:2
driving 56:11 67:18 111:11 114:24 143:23 144:2 146:18

171:23 223:25 251:8 278:22
drop 131:19
dropbox 10:17 70:9,14 103:13 103:14 285:2
dropout 108:13 108:15
dropouts 108:12
dropped 108:5 108:8
dropping 108:19
drs 72:7 74:6 162:1 167:10 280:22
drug 23:6,13,18 32:17,18 60:22 60:25 203:14 251:20 261:11
drugs 25:25 95:24
due 156:11 165:4
duly 8:2
duplicate 80:25 118:1
duplicated 52:16
duration 144:9 179:8 183:14 194:1,15 195:13,13 214:17 216:7 216:11 217:10 248:17

e

e 4:1 5:1,14 6:1 7:1 28:3,3 133:7
e.g. 180:1,20
e1 283:23
earlier 51:17 90:21 99:9 103:2 110:8 121:6 138:18 146:10 150:20 159:7 161:10 163:18 166:18 182:2 189:3 202:23 203:4 238:5 247:12 247:13 259:10 277:5 279:7,15 280:20 284:12 289:8
early 181:25 182:1
easier 233:18
eastern 118:4
easy 8:21 192:13
eating 162:13
editor 24:1,5,15 24:16,18,20
editorial 5:21 23:5,9,12 24:8 24:17,18 25:23 26:2 169:17 170:1,3,5 261:9
editorials 25:22
editors 283:15
edizioni 269:19 269:24
educational 25:15,23 26:7 26:16
effect 104:10 111:12 149:19 174:21 175:19 175:24 176:4,9 176:12,16,17 178:20 192:7 193:2 201:23 201:23,25 267:2 284:7
effects 92:11 96:2 133:21 286:6,8
efficacy 95:24
efficiency 185:14
egg 224:17 225:13
eggs 225:5 226:7,8
either 10:16 24:4 56:8 57:2 57:24 81:20 87:7 113:5 114:8 120:15 139:13 151:8 223:15 235:6
elevated 128:10 172:1 212:3,23 224:22 260:21 260:22 261:1
elevation 282:16
eligibility 81:8 244:21
eligible 251:1
emerging 278:6
emphasis 52:22
emphasize 165:22
emphasized 53:9
empirically 129:5,9
employee 291:18
employees 139:15
encephalopathy 28:3
encouraging 282:19
ended 74:10
endometrial 192:21 267:21
endometrioid 266:2
endometriosis 257:2
endpoint 278:22
english 129:8
enhance 224:17 225:5
enhanced 225:22

enhances 278:7
enrolled 178:19
enrollment 106:7,8,13,24 107:20 108:25 110:5,13,16 111:9,18 118:8
entail 20:2
entails 20:4
enter 286:1
entirely 117:25 125:7 126:1 136:6 156:18 172:16 173:23 174:1 218:20 284:14
entirety 15:17 241:6
entitled 83:25 84:21,23 102:10 276:4 281:14 285:5
environmental 276:9,18
epa 6:19 68:25 69:10,15,15,19 74:1,9,16 78:24 78:24 268:17 268:19 275:21 275:25 276:4 276:19 277:5,7 277:19,22 278:14 279:5 279:14,20,21 280:11 281:8 288:23 289:15 289:17 290:14
epa's 268:21 278:22 290:10
epidemiologic 62:16 81:8 95:9 164:10 206:15
epidemiologi... 86:20 88:24 89:8 105:1 266:24 286:15
epidemiologist 176:5
epidemiologi... 69:3 174:22 175:24 176:8
epidemiology 19:24 201:15
epithelial 35:14 35:15,17,21 36:4,6,7,13 93:8 99:6,10,23 100:11 192:19 192:24 193:10 227:3 260:19 266:1 284:4
epithelium 265:21
equal 116:14 216:12 231:9 248:21,22 249:1,16
equally 167:2
equals 177:5,8 184:24 185:20 196:4,15 212:23 213:3 213:15 220:7
equate 170:8 205:2
errata 292:9,12 292:17,21
error 104:9 287:22
errors 165:4
especially 104:10 247:12
esq 2:4,12,20 292:10,12 293:25
essentially 24:12
establish 174:13,15 230:9
established 87:25 97:8 101:15 174:4 268:1
estimate 14:23 15:22 16:4 98:12 131:6 136:19 137:11 137:12 140:25 141:4 142:12 143:4 144:3 145:21 146:9 146:10,22 147:20 148:15 151:11,14,16 159:9 178:18 181:17 192:7 193:2 194:10 195:3 201:23 201:24 209:19 209:24 210:17 212:23 222:7 223:8 234:19 251:12 255:9 260:23,25
estimates 104:10 107:13 108:17 111:12 134:13 146:18 150:14 151:7 182:10 197:3,7 198:15,25 210:7,11,15,23 218:25 219:1,3 223:4 239:21 249:6 251:8 252:4
estimation 17:22
estimations 194:19
estrogen 224:20
et 5:7,9,11,13 5:15,17,25 6:5 6:7,9,13,16,18 7:5,7 74:22 83:18 85:9 86:16 104:1 117:14 127:2 127:15 133:7 133:10 138:6 161:24 177:7 178:18 187:22

191:10,12 207:4 219:18 220:1 230:23 231:4 248:10 248:12 251:14 269:16 283:5 285:11,18 286:20
ethnic 253:13
etiologic 101:2 101:8,11,20,22 158:21,24 235:24 245:22 250:23
etiologically 142:16 143:9 165:20 167:21 177:19,21 179:1 181:3,22 182:17,21 183:16 186:8 242:22 243:5 247:3 251:23
etiology 100:25
eval 94:18
evaluate 116:25 133:20 206:22 264:24 288:3,4
evaluated 43:22 50:21 66:2 67:14 94:11,13,16 99:11 183:3 192:18 208:4 223:21 233:9 238:14 289:22
evaluating 100:17 114:20 121:5 162:15 163:6
evaluation 116:2 202:22 218:9 289:22 289:25
evaluations 290:4
evening 11:1
events 93:9 284:6
everybody 235:7 267:19
evidence 23:10 45:19 47:13 50:13,19 53:3,8 53:11 57:4 62:8 62:10,11,12,14 62:24 63:17,19 64:22 65:3,7,12 65:17 66:8,9 67:20 68:7 69:3 69:5 74:13 75:8 86:20 89:20 141:10 161:13 174:25 195:8,9 197:8,20,21,23 198:2,11,13,14 199:21,23 200:3,24 201:13 202:7 203:3 205:14 205:17 206:19 211:12 212:18 213:2,5,13 220:6 226:21 227:1 229:8 231:23 232:11 262:17 266:25 267:10 278:5,8 278:9 284:13
evolving 246:24
exact 15:2 29:2 46:6 53:6 101:5 137:15 214:24 217:17
exactly 19:2 39:14 53:14 56:3 58:19 64:1 64:19 71:4 82:6 84:13 91:2 120:7 131:4 181:2 240:4 256:8 264:9 282:23 284:6
examination 4:5 8:4 275:12 291:12
examine 93:1,2 115:8 143:21 157:7 208:20 211:2 233:12
examined 8:3 68:11 81:17 105:5 113:20 231:6
examining 62:8 62:19,21 76:20 197:11
example 28:2 40:18,19 41:4 56:10 60:21 66:11 67:8 69:5 76:11 78:22 80:24 82:15,17 82:21,22 84:13 93:6 99:17 107:8 110:12 145:25 158:22 162:13 186:14 237:6,7 240:12 246:24 253:5 255:16 266:2 282:17
examples 176:15 264:1 264:22
exceeds 185:7
excess 163:9
exclude 47:17 80:12,13,18 101:24 239:25 240:14 246:2
excluded 47:18 51:24 52:1,21 79:19,22 80:14 80:19,22 81:23 83:3 84:16,19 102:6 113:13 113:18 239:19 239:21 245:25 251:13
excluding 81:4 116:22 247:13 251:14

exclusion 85:5 245:21
excuse 95:6 152:7 155:13 191:14 220:4 248:21 272:12 285:19 286:7 289:6
exercise 240:18
exhaustively 261:3
exhibit 4:9,10 4:11,12,13,14 4:16,17,19,21 4:23 5:3,4,6,8 5:10,12,14,16 5:18,20,22,24 6:3,4,6,8,10,12 6:14,15,17,19 7:3,4,6 9:7,10 13:23 14:1 18:9 30:25 31:1,2,3 34:15,18 37:11 37:12 41:13,16 42:6,8,17 47:20 47:23 52:8,10 57:6,7,9 61:8 85:16 86:17 88:9 104:2,4 114:2 117:12 117:15 127:3,4 129:14 133:8,9 136:22 138:5,7 154:5,8 169:21 169:25 170:2 179:14,16 187:21,23 191:10,13 207:3,5 219:17 219:19 227:15 230:21,22,24 230:25 241:13 248:11,13 256:15,22 269:17 275:24 276:3 281:13 281:18,20,23 283:4,6,11 285:5,12,13 287:20 288:24
exhibits 1:2 7:9 72:16
exist 77:12
existence 132:17
existing 20:23 188:11,25
expect 123:21
experience 114:5 274:4
experimental 67:10 92:6,9,19 93:2,7,12,13 287:4
experiments 67:9 271:8
expert 4:14 8:9 12:15,21 25:24 31:2 32:9 33:17 33:25 34:5,11 34:17,21,22,25 51:11 72:12,22 77:1 87:5 102:14 114:7,9 114:15 115:1 115:12 116:2,4 116:16 118:22 118:23,25 119:6 120:17 121:5 126:24 127:10 133:14 141:24 152:15 154:5 167:18 207:7 208:1,5 219:21,25 222:2,3,24 231:14 233:11 263:19,23 269:22
expertise 266:8 271:14 274:25 275:3
experts 11:17 11:20 72:14 74:2 116:13,20 116:21 139:12
expire 112:9
expired 107:10 112:17
expires 291:24
explain 21:13 23:20 25:14 26:25 41:5 82:13,22 84:18 84:21,24 94:21 101:10 124:25 143:3 165:8 170:11 177:14 199:18 203:10 239:18 251:1 252:15,16 258:2 263:6
explained 80:21 261:7
explains 82:20
explanation 189:19 190:25
explicate 204:23 245:20
explicit 120:19 135:12 283:22
explicitly 117:7 120:5 215:16 245:15,17 246:11
exploratory 165:6,21 166:1 166:19 167:1 167:13 168:3,8 168:11,14
exposed 130:11 189:13 190:6
exposure 44:11 50:14 74:25 76:3 95:13 96:20 98:7 102:11 103:11 111:13 124:4 129:3 140:10 143:9 145:12 146:20 150:16 156:5 167:22 170:9,10 171:1 171:3 177:22

179:2 181:23 183:14 185:12 185:15 187:16 192:16 194:13 194:14 195:19 196:17,18 231:7 239:4 241:3 245:5 247:3,6 250:24 251:23 253:21 254:8,10,15 256:18 257:7 262:13 263:8 270:21 277:2 277:23 279:1,3 280:1 285:20 289:17 290:8
exposures 94:23 107:2
extend 194:16
extent 10:6 12:2,9 33:20 35:21 63:2,11 72:11 115:6 129:2 186:11 195:2 270:11 276:21 281:5
external 132:8 132:11,11,16 282:12
externally 284:19
extreme 214:7 261:23

f

facilitate 264:9
fact 69:3 70:9 95:22 100:1,10 100:14,16 101:4,7 115:21 118:13 119:11 120:8 121:14 121:14,17 122:2,25 124:3 124:25 145:11 158:3 171:5,7 185:13,18 187:15 190:22 192:23 200:6 206:22 210:14 224:7 227:22 228:25 231:17 262:25 280:13 280:17,18 281:2 288:9,17
factor 38:9 49:14,16 66:21 67:5 96:14 99:1 114:22,23,24 115:3,3 204:2
factors 37:24 39:7,7,17 40:14 41:5 49:11 50:10 66:23 67:5,13,18 98:15 101:6,15 114:22 125:6 162:12 163:10 224:6,16,24 246:12 277:17 281:14
facts 48:7
fair 21:23 30:16 40:15 42:21 47:5 65:22 78:8
fall 289:19
fallop 242:14
fallopian 169:6 169:7 241:9,17 242:6,11,15 244:9 265:21
familiar 47:24 75:23 133:16 139:1,3 169:17 187:24 200:15 206:15,16,25
family 19:8 23:7 40:22 49:14,22 50:4 261:11 274:1
far 10:19 34:8 87:16 105:25 139:14
fast 130:1
fat 224:17 225:5,13 226:7 226:9
favors 202:22
fda 68:22 70:17 70:18,21 71:15 74:14,15 120:16 229:9 229:11 280:22
fda's 73:18
features 265:17
february 5:4 57:8
federal 52:11 274:16
feel 65:8 73:11
fell 128:1 131:1
felt 65:23 66:5 242:21,22
female 39:23 40:4 265:20
feminine 105:7 129:19
fewer 116:14
fiber 75:1
fibroids 69:6 93:6 288:1,17
fibrous 76:17 76:22
figure 221:21 255:1
figures 48:7
file 9:24 10:5
filed 9:22
filing 58:24
final 37:18 43:5 74:20,21 104:19 128:16 164:18 166:12 180:13 196:3 226:13 234:17 250:4 260:8,11 262:11,12 266:11,18 269:10 270:2 271:18 276:12

276:19 277:8
finally 56:7
financial 88:2,3
financially 87:15 291:19
find 55:7 68:17 81:17 82:22 88:15 197:8 217:6 221:23 228:11 229:6 229:21 247:2 256:16,20,20 272:20
finding 125:25 165:5 166:18 166:20 257:25
findings 70:18 87:19,20 115:5 125:9 166:25 211:5 229:9 258:6 259:19
fine 15:3 109:9 169:10 188:19 206:13
finer 86:5
finish 8:23,24 109:25 124:21 124:22 167:8 178:3 215:10 262:21
finished 178:2
finken 3:5 21:7
fired 269:12
firm 118:23,24 213:15
first 18:17 20:4 20:9,10,11 21:12 25:7,13 26:25 30:15 34:24 44:8 49:13 52:14,20 54:24 71:3 95:2 95:18 97:16,20 98:23 104:13 104:14 108:8 110:20 111:3 118:6 125:14 126:19,22 134:6 135:5 136:1 140:2,3 140:24 147:1 155:7 156:19 157:14 158:1 162:16 163:11 164:9,18 166:12 167:22 170:6 174:17 175:1,4 178:14 179:17,18,21 180:11,12 186:25 188:8,9 189:9,22 196:3 209:3 215:20 215:24 217:23 217:24 224:8 224:13,15 225:25 228:2 228:15 231:3 231:11 233:24 235:14 238:13 247:2 248:20 248:20 252:2 253:8 258:3 263:14 264:17 266:11,19 270:16 276:14 277:15 278:20 284:1,17 287:2 288:24
five 145:13,14 195:17 216:25 216:25 217:3 260:10,16 268:6
fixing 61:15
flawed 145:24 191:8,8
fletcher 269:6
flip 21:1 28:24 38:17 164:9 217:19 238:21 239:11 289:5
flipping 86:12
flom 2:19
florida 2:14
focus 93:17 113:6 141:16 142:23 145:18 203:17 237:14 290:9
focused 35:21 122:4,5 125:4 289:25
focusing 82:3 193:24 290:15
follow 46:2 58:5 106:9,15 106:19 109:1 110:5,16 111:9 112:10 140:11 142:15 143:3 143:10,24 152:8 153:5,17 153:19 155:5 155:17,20,22 156:1 158:22 158:23,24 159:6,13,24 160:1,6,11,12 160:14,20 177:17,18,20 177:20 179:5,8 179:10 180:4 180:22,25 181:4,4,7,8,10 181:23,24,25 181:25 182:12 182:13,17,20 182:24 183:15 258:22 259:24 275:11
followed 179:12
following 41:10 105:4 107:17 179:4 181:6 202:16 229:19 272:11 282:11 293:7
follows 8:3 80:6 91:11
footnote 156:2 201:19 240:21

241:15 244:7 253:13
foregoing 291:6 291:15,21 293:6
forest 251:3 254:25 255:1
forget 148:5
form 12:12 16:6,10,14,18 16:24 17:6,24 25:9 26:21 27:22 28:10,17 30:7 31:25 32:4 32:23 33:5,15 35:19 36:17,22 40:10,17 44:12 44:14 46:11,23 47:11 48:25 50:1,24 52:25 54:2 55:1 56:15 64:17 65:11 67:6 71:17 87:12 88:5 89:17 90:16 91:21 92:20 96:11 100:5 107:4 116:5 117:5 119:15 120:10,22 123:23 128:11 129:1,7 130:15 146:11 147:13 162:5,18 163:13 169:8 173:8 176:1,7 190:16 195:6 206:9 209:1 211:22 213:1 213:18 225:24 229:17 232:4 235:12 239:2 242:1,17 243:23 252:14 254:1,5 263:25 267:7 268:14 271:5 273:15 290:2
formal 18:25 190:14
formation 115:16
forming 272:10
forms 73:13 87:15
forth 154:10 291:7
forthcoming 29:18 30:21
forward 38:17
found 75:9 131:13 224:3 228:25 229:1 245:24 257:13 268:11 280:12 280:21,22,23
four 22:18 31:4 33:18 51:15 53:5,5 74:25 106:1 160:12 160:13 178:25 220:16,20,21 221:12,16,24 222:14 223:13 235:15 252:4,8 252:9,19
fourth 105:15 106:9 107:18 107:19,21 108:8 127:12
foutch 33:7
fragments 75:24
framework 199:16,20 200:16 203:13
frameworks 199:19
frequency 45:18 144:8 145:16,17 148:7 183:15 194:15 195:12 195:13,18 214:17,24,25 215:2 216:6,7 216:10 217:10 242:20 248:17 258:9,11,19,19 258:25 259:22 260:4
frequent 147:14 150:17 209:10 231:7 234:8,14,19 235:25 241:20 243:14,17,21
frequently 37:4 145:9 174:21 209:14 210:4
front 34:19 48:9 86:7,14
frontiers 23:6,6 23:13,17,21 261:10,11
frowned 190:22
fruits 149:19 162:14
fulfill 96:16
full 39:5 52:3 62:1 78:25 106:6,10,17 107:14,18 110:18 164:10 170:6 178:14 179:18,21 180:11,12 201:9 215:20 228:3,15 233:25 235:14 260:8
fulsome 262:14 263:1
function 186:4 186:5 187:12 187:14
funded 21:19
funding 21:24 114:25 120:15 233:13 270:4
further 80:10 134:22 203:7 204:5 227:5

251:12 254:16 275:8 278:7,9 282:14 287:13 290:20 291:17
furthermore 214:16
future 290:4

g

gabriel 5:11 85:9,14 117:12 117:14 122:3 126:7
gathered 63:22
gathering 62:12
general 31:18 64:18 66:18 170:19 187:9 195:7
generally 15:21 20:3 22:14 27:19 36:20 48:2,5 97:2 113:25 170:16 174:22 175:24 187:13 234:23
generating 166:19 167:14 168:9
genetic 98:25 224:23 274:2
genital 35:2 38:5,9 39:24 40:5 50:14 85:11 89:11,15 89:22 94:14,19 95:1 102:10 103:9 105:9 106:4,13,14 108:24 109:1 111:9,13 123:15 124:4 124:11 125:3 129:19 137:8 167:5 170:13 170:25 171:13 189:14 209:10 212:9 214:18 214:25 215:3 216:7,13,18 246:16 260:19 273:19,21 285:6,23 286:16 288:5
gerel 2:3
getting 21:2 54:16 98:12 108:18 130:5 135:8,9 181:24
ghassan 270:4
give 8:19 11:9 31:6 38:1 43:8 56:22 61:12 66:12 68:10 70:10,12 82:25 88:21 97:6 98:8 103:16 106:20 109:18 123:24 136:11,14,15 136:17,18 138:15 142:23 143:1 152:20 159:15 166:13 168:25 176:2 178:15 186:14 207:8,8 210:1 211:6 217:23 230:2 237:7 238:19 239:14 243:25 244:17 254:18 272:19
given 11:17 30:4,4,12 31:4 60:22,25 65:23 97:23,24 170:18 238:25 279:6
gives 151:20
giving 51:11 64:2,7 68:14,15 237:20
glad 183:20
go 26:17 31:10 33:2 41:22 42:25 53:15 55:9 58:1 68:15 74:14,15,15 86:11 96:21 98:17,18 99:17 101:16 103:16 108:6 109:23 110:12 115:23 117:3 120:2 125:25 127:21 131:7,9 132:5 137:23 152:18 153:25 154:2,4 154:10 157:8 157:16 160:5 163:3 169:21 170:11 171:4 175:2 183:2 184:6,8 190:17 191:22,24 192:22 195:10 195:14,24 196:23 201:8 203:7 207:23 212:8 214:25 216:21 218:13 221:17 222:13 233:22 237:5 240:12 243:24 244:19,25 248:4 249:8,11 253:12 259:9 259:20 260:15 262:7 266:21 273:16 275:4 276:16 279:17 281:23 285:21
goes 27:23 40:14 175:13 218:19 246:23 250:17 251:7 288:17
going 9:24 10:4 22:17 26:9 29:6 40:11 59:6 63:14 64:2 66:5 67:10 73:22 75:11 76:7,24 84:20 85:20

86:7 89:18 91:7 109:22 137:14 139:17,23 154:10 161:21 161:25 164:17 165:23 166:23 176:16 179:6,7 179:8 186:6 192:19 193:7 197:3 201:16 205:15 218:13 219:14,15 222:20,23 229:4 230:10 230:19 256:17 256:20 259:23 269:9,11 276:15 284:15
gonzalez 160:16,20
good 8:6 92:8 92:18 93:18,21 95:22 126:25 129:20,21 138:16
goodman 5:15 83:18,21,23 84:20 132:23 133:5,7,10
goodmans 83:21
gossett 5:20 169:16 170:1,3 173:20 218:20
gotcha 41:7 60:17
gotten 123:5
government 139:14
governmental 279:16
grade 199:16 199:19,20 200:6,7,15,16 200:21 201:12 201:13 202:1 202:22 206:16 238:22 240:7
graded 200:24 240:13
gradient 66:22 262:15 263:6
grading 203:9
grams 131:15
grand 15:9
grant 22:4,9
grants 21:12,14 21:15,22 22:9 22:16,23
great 131:20 154:11 178:12 272:25
greater 146:21 182:14 208:24 216:12 231:9 243:22 245:4 249:12,16,19 249:25,25 250:1,4,5 253:6
grew 231:19 233:5,21
group 23:18,21 108:10 109:2 112:4,4 144:11 172:7,21,22 173:6,10 174:1 182:25 186:5 197:24,25 204:21,22 269:25 284:10
groups 171:24 172:6,24 173:11 174:2 211:10,12 213:8
guess 31:22 63:10 66:18 68:10 90:12 91:8,9 125:11 128:3 166:7
guidelines 199:24
guys 21:1
gyn 38:16
gynecologic 86:22,24 274:5
gynecological 105:8
gynecology 36:20,25

h

h 6:15 248:12
half 107:9,22 108:22 112:8 140:24 147:1,3 260:9 265:12 278:20
halfway 88:19 93:22 166:11 194:2 202:17
hampshire 118:4
hand 27:24 84:10,12 120:18 136:4 236:10 243:5 250:18 293:19
handling 24:15 24:20
handy 70:2
happen 235:9
happened 146:3 156:4
happens 111:21 239:25
happy 109:21 184:3 230:7 264:9
hard 245:1 269:14
harlow 162:2 167:10 194:24
harmful 96:2
harmonize 183:13 241:9 244:10 247:5,5
harper 6:18 269:8,8,16
hate 116:18
hazard 143:16 144:12,14,15 146:5 147:7

149:9,10 150:18 151:3 162:17 164:7 172:10,12,17 172:18 182:9 242:9 243:14 243:15 253:14 253:14 288:12
head 8:20,21 70:23
health 6:10 18:19,25 19:8,9 19:12,14 36:15 45:8 63:15 64:16,20 98:1,3 98:16 154:23 155:13,23 157:21,23 158:1 160:10 162:11 203:6 203:19 204:7 205:7,20,23 206:23 226:23 227:7,11,14,21 227:23 228:1 230:16 236:6 241:4 260:17 262:2,6 265:9 265:10,11 266:9 273:18 276:22,25 278:22 284:13 284:16,17,21 285:3
heard 78:24 269:22,23
hearing 53:19 53:21
heavily 52:18 53:12 101:4 202:22
height 39:8
help 77:17
helpful 24:23 194:7
helps 159:20
henderson 229:20,23
heterogeneity 98:24 101:2,8 101:12,21,22 189:20 197:9 197:16,22,23 198:2 199:5,14 211:12 213:2 213:13 218:12 220:7 223:6
heterogeneous 99:12 265:19
heterogenic 198:12 212:18
hide 31:12
high 201:4 237:3 240:13
higher 40:22 106:18 124:24 125:1 137:12 163:19 172:11 177:6 209:9,14 209:24 211:9 212:13,16 218:17 237:20 239:1 242:10 242:16,23 243:6
highest 40:16 237:16 251:22
highlighted 174:23
highlighting 59:11
highlighting's 59:3
highlights 58:15,20
highly 111:23 257:12,19
hill 53:22,25 54:13,24 56:21 62:22 64:5 65:5 65:9,21,24 100:4,7,21 197:12
hill's 54:16
histologic 35:22 193:9
histological 35:17 36:9 193:23 265:16
histology 192:1
historic 104:8
histories 40:22
history 49:15 49:22 50:4,5 71:16,21 110:7 274:2
histotype 214:20
hoc 178:5 190:21 191:9
hold 227:13
holding 28:7,13 187:3,10
hope 78:14 139:4
hormonal 38:25 94:23 257:2
hormone 48:24 91:15,20
hospital 198:6
hotel 1:19 13:16
houghton 154:24 160:25
hour 13:2 275:15
hourly 13:7
hours 11:1 14:24 15:1 240:10 261:3 270:17 271:2 271:10,11
housekeeping 271:18
hpv 286:5
hr 161:12,16 162:3 171:9
hrs 171:8
huh 104:24 118:20 123:9
human 62:16 202:6 203:2,18 203:22,23

228:5,19,22 250:24 251:23 276:25 279:22 280:5
humans 202:6 203:2 229:5
huncharek 221:9 222:19 223:14
hundred 16:9 33:4 268:6,6,7
hundreds 264:3 264:5
hygiene 105:7
hypothesis 166:19 167:4 167:14 168:8 168:12 214:8 214:11 235:5 261:23 282:11
hysterectomy 91:1 137:7,11 137:20 163:20 164:6 170:13 170:21 246:13

i

i.e. 35:2 110:6 128:21
iarc 74:8 204:19,21 205:3,5,6 206:16,17 280:11 284:10
iarc's 204:10
idea 227:24 284:19
ideal 136:3
identified 75:1 79:9 80:14 228:6,20 291:8
identifies 195:17 289:17
identify 78:18 79:13 129:16
ignore 55:14
impact 49:6 164:7
implication 49:16
implications 158:8
implicitly 246:11
implies 49:24
importance 54:9,13,19,25 55:3,5,19 115:11 165:22
important 26:7 27:11 49:14,16 49:21,25 50:4 55:8,13,20 59:22 60:2,7 61:3 65:24 73:21 102:1 114:20 115:9 115:16 117:7 167:2 174:23 175:25 176:6 239:18,24,24 255:5
importantly 135:24 217:9
impossible 110:15 151:15
imprecise 151:20
impressed 206:5
improper 263:3
inability 168:20
inadequate 44:10
inappropriate 191:6
incidence 48:18
incident 49:8 98:9 285:7
inciting 286:3
include 18:1 39:11,11 80:12 81:21 85:9 90:24 118:3 159:5 222:23 235:4,22 236:4 241:8 244:9 252:18 254:21 276:25
included 35:22 47:18 61:12 70:7 76:14 78:19 79:17,20 81:8,13,14,19 85:3,25 99:16 102:2,5 112:24 115:12 127:15 127:17 178:23 189:5,12 190:1 198:17 217:6 220:17 221:12 223:15 236:9 237:2 240:24 245:2 246:15 248:9 252:3,8 254:19 260:2 260:17 272:10
includes 46:3 80:11 205:7 235:1 246:12 258:4 279:1
including 8:18 62:16,17 94:5 153:16 245:5 265:20 269:21 277:17
inclusion 85:4 241:6 243:22 244:13 245:20 246:6 252:4 258:25 259:6
income 16:17 16:25 17:10,13 17:23,25 18:3
incompatible 125:9 263:10
inconclusive 92:8
inconsistency 163:2
inconsistent 161:14 257:24 258:6,18

259:18
incorporate 19:7 153:16
incorporates 19:4
incorporation 18:22
incorrect 145:11
increase 97:23 110:20 111:6,8 123:22 124:5 126:2 135:20 151:5 157:9 177:9 186:2 192:21 201:6 220:4 224:24 226:10
increased 35:4 44:13 48:23 107:25 108:1 109:13 110:5 121:15 125:6,7 149:21 152:13 155:21,22 157:20 159:13 160:1 164:11 171:19 173:10 174:15 187:11 187:12 193:6 215:4 225:1,8 225:23 234:14 237:25 279:12
increases 36:6 101:17 113:5 165:17
independent 97:18 237:25
indicate 110:6 111:10 122:2
indication 94:21 95:6,11 95:19,21 96:3,6 96:23,23
indicative 201:11 203:8 205:18 267:2 267:11
indirect 229:7
indirectly 228:23
indisputable 229:10 280:8
individual 142:9,12 162:11 183:3,5 184:13 274:24
individually 223:15 247:22
individuals 286:4
induce 271:16
induces 270:21
inducing 94:6
inference 46:15 64:4
inflammation 85:12 93:8 94:6 227:4 284:5 287:7
inflammatory 94:23 282:14 282:17 283:17 283:19 286:3
inflate 181:13
inflates 183:19
inflation 13:5
influence 49:6 182:5,6 251:11
influenced 182:3
influences 186:11
information 110:14 143:18 162:23 262:14 266:24 289:18
informative 28:4,6,9,16 143:14 159:4,4
inhalation 76:9 90:10 277:2 278:25 279:3
inhaled 279:10
inhibitors 95:25
initial 11:21 152:13 156:22 157:23 160:20 161:2 178:7 185:19 187:18 257:25
initially 122:3 148:24 156:24
initiate 93:9
initiative 154:23 155:13
initiatives 155:24
injuries 276:25 282:15 283:18
injury 276:22
inquiries 34:4
inquiry 33:22
insignificant 128:6,9
insoluble 226:25
installation 230:4
instance 35:25 162:16
institute 4:17 18:23 19:12,13 19:15 21:18 41:15 42:1,17
instruct 17:14 17:20
instructing 17:19
instructions 292:15
instructs 9:2
insufficient 153:2,4
intact 125:3 126:9 137:8 163:5 166:20 169:7 174:19 175:22,23 241:9 244:9 246:16 259:11

intake 224:16
intend 152:4 275:1
intended 60:16
intensity 194:15
interact 157:11
interaction 171:18 172:10 173:4,12 210:8 212:1,3,7,19,21 213:6,24
interactions 125:17 219:1
interest 114:7 114:18 118:19 119:12 121:4 231:18 273:18 287:25
interested 288:8,15 291:19
interesting 111:15,16
interpose 139:16
interpret 69:5 107:11,24 109:10 162:21 172:1,23 173:16,18,19 205:16,17 233:19 271:7
interpretation 36:4 115:4 171:17 172:16 172:20 173:1 173:21,22 214:10 217:5 219:2 237:1,4,8 237:12 259:13 261:19 266:24 270:13 288:8
interpretations 141:12 173:5 233:15
interpreted 110:11 161:12 165:6 167:1 202:3 267:9
interpreting 172:9,14 213:23
interprets 287:10 288:11
interval 141:3 141:20 142:4,5 142:8 144:12 146:23 149:13 151:6,21 191:21 193:3 209:20,25 210:20 211:19 212:14 250:12 255:15,18 257:14
intervals 136:18 143:17 146:16 192:9 197:6,17 210:9 210:13,24 211:2,16 212:20 251:5 255:24 256:3 261:15
intervening 65:23 106:11 108:21,23 109:2
interventions 199:22 203:14
intrauterine 230:4
intravaginal 230:5
introduce 85:15 230:20
introduced 227:10 229:20
introduction 153:14,14 234:2 284:1,2
invasive 36:12
investigation 281:14
investigators 132:13 134:14 280:21
invoice 4:11 14:1,2,9,18,25 15:17 78:9
invoices 14:11 17:3
invoke 190:25
invoked 189:19
involve 108:21
involved 119:13 119:22
involvement 139:19
involves 120:8 197:11
involving 126:14 163:4
irrelevant 177:19 181:3 183:17
irrespective 186:20
irritants 286:3
irritation 95:17
isolation 60:11
issue 28:8 31:18 51:8 58:5 135:16 140:12 158:1,18,21 191:2 230:11 230:17 239:23 251:7 258:19 270:13 275:17
issues 113:24 116:12 121:9 121:13 135:11 158:18 176:11 189:24 267:17 279:17
issuing 276:19
iwona 5:10 117:14

j

j&j 71:15 264:6
jama 138:25 169:18 170:6

january 4:19 12:7 14:4,17 16:3 29:8 42:7 42:17
jersey 1:4 8:14 274:19,21 293:1
job 24:12,22
johnson 1:6,6 8:7,7,10,10 68:23,23 284:21 292:3,3 293:2,2
johnson's 35:3
joined 23:5,12 24:6
journal 23:16 24:8,14 86:25 104:14 139:1,5 269:18,22 270:1
journals 23:5 23:19,21,22 24:1,5 114:11 261:10,14,16 269:24 270:1
judgment 111:25
julie 5:14 133:7 133:10

k

k 2:5 6:17 28:3 269:16
kadry 6:5 191:12
katie 5:8,16 7:6 91:7 104:1 138:6 283:11 285:8,11
keep 17:2 24:7 34:19 43:3 126:22 154:11 173:5
kemi 7:4 283:5
kiarash 6:8 219:18
kidney 25:25
kind 43:7 57:15 87:14 95:10 114:8 181:24 186:10
kinds 87:22
knock 157:17
know 8:17 9:4 10:13,19,25 12:2,4,13 16:8 16:12,15,25 17:1 18:2,21 19:3,11 20:7,16 21:20,21,21 24:4,16,16 25:17,19,24 26:1 27:4,8,9 27:17,23,24 34:4 35:22 36:5 36:13 39:8 40:2 40:6,11,12,13 40:18,19,21 44:2,3,5 45:6,8 45:10,14,16,18 46:5,6 47:15,16 47:16 48:8 49:3 49:20 50:17 53:4,6,7,10 54:20 55:9,14 55:21,21 56:7 56:11,20 57:16 59:4 60:11,20 60:20 61:16 62:11,18,25 63:21,24 64:3 64:19,22,23,23 65:2,3,17,18 66:4,7,7,10 67:15,23 69:6 70:21 71:11,14 71:18,20 72:10 72:15,16 73:1,8 73:16,18 74:1,2 74:3,16 75:9,10 75:21 76:12,13 76:20,22 78:22 78:23 79:6,22 79:22 81:1,14 82:2,3,7,16,18 82:20 84:14,19 84:19 85:1,3 87:7,13,14,16 87:18,21 89:2 89:19 90:8,11 90:21 91:23 92:24,25 93:14 93:14,16 95:8 95:15,17,23,24 96:13,13,13,14 96:14,19 97:17 98:4,5,7 99:14 99:25 100:19 100:21 101:3,6 101:8,14,14,15 101:17,19 102:1,2,4,6,16 102:16,20 107:7,23 108:2 108:11,15,17 108:19 109:9 109:10 110:11 111:23 112:7 112:15 113:20 113:23,23 114:8,25 115:4 115:7,8 116:12 116:21,23 117:2 118:1,4,5 120:9,16,20,23 120:24,25 121:2,8,8 122:21 124:19 125:5,8,17 128:23 129:5 129:11,14,20 130:6,13,19,21 130:23 131:5,7 131:9,10 132:20,25 133:1 134:24 135:5,17,19,22 135:22,22 136:8 138:20 138:21,22 139:15,23 140:10 143:8,9 143:13 144:8

145:9 146:14
146:17 147:24
147:25 148:3
149:17,18,19
149:20,22,22
150:4 151:1
153:10,19,23
155:22,25
156:4 157:11
158:5,19 159:3
161:20 162:7,7
162:9,20,22
163:25 164:1,3
164:3,7 165:10
165:21,22
167:23,23
168:1,12 169:1
169:1,6,10,11
169:13,13,15
171:17 172:12
172:18 173:3,9
173:20,24
174:12 176:8
176:10,13
177:24 179:4
180:6,25
181:16,18,20
182:9,10,16
183:18 186:4
187:10,16
190:12,17,18
190:19,22
192:18,23
193:5,6 194:19
194:20,25
195:8,10,14,21
195:22 196:24
197:2 198:7,12
198:17 199:15
199:20,21,22
200:12 201:2,4
201:5,7,9,13
203:11 204:1
204:17 205:22
206:2,12,18
208:8,10,10,14
210:10 211:24
212:4,17 213:9
213:23 214:3,3
214:4,6,10
215:6 216:24
216:25 217:3,4
220:10 222:2
222:15,16
223:3,7,8,10,21
223:25 224:1,1
225:14,16
226:3,4,22,24
226:25 228:24
229:4 231:13
232:3,6,13
233:4,10,11,14
233:16 234:13
234:15 235:25
236:25 237:2
238:25 239:3
240:2,2,3
242:20 245:17
246:1,14
250:17,21
251:2,10,14
252:17,20
253:16,17,19
253:21 254:6
255:18,19
256:4 258:2,13
259:2 260:1,4
261:5,14,18
262:18,24
263:2,3,7,11,18
263:20 264:6
264:17,21,23
264:24 265:3
265:25,25
266:4,6 267:8
267:11,19,23
267:25 268:2,8
269:14,24,25
270:1,11,14
271:6,7,11,12
271:15 272:5
273:20 274:12
274:15,18,20
277:16 278:1,2
278:6 279:8
280:9,10,14,20
280:21,23
281:4,7,10,25
282:24 284:11
284:12 287:3,5
288:11,13,17
289:8 290:3,5
knowing 288:18
knowledge 9:16 65:2 139:12 231:22 293:7
known 65:19 78:2 135:25 198:4 279:22 280:5 284:8 286:12
knows 17:13

l

l 285:9
lab 27:8
lack 137:21 177:11 198:12
lacking 94:8 262:14
language 68:21
large 91:11 152:7 263:16
largely 91:13 203:5
larger 124:13 125:12 179:25 180:20 186:15 256:2
largest 185:8
laryngeal 277:1 279:2,24 280:6
lastly 279:13
late 182:1
law 118:23,24 205:23 206:7,8
lawyer 15:5 206:11,14
lawyers 33:22 77:7 133:15,16 270:6

lazar 231:13
lead 93:9 227:4 227:5
leading 284:5
leeway 68:11 68:15
left 23:9 149:8 269:1
lends 284:18
length 145:17 145:18 179:12
lens 62:21 65:19
lesser 67:22
lethal 111:23
letter 161:21 162:1 165:23 166:23 167:6,9
letters 171:16 199:16
leukemia 32:20
level 98:11 199:13 267:25 268:8
levels 144:7 169:15 250:24
levin 2:11
levinlaw.com 2:16
li 52:15 53:10
liability 1:9 32:6 292:5 293:4
library 79:7
lifestyle 38:24 132:1
lifetime 195:3 217:10,17
ligation 90:25 123:4,14 124:8 124:15 125:2,8 125:12 126:2 137:12,20 157:10,13,14 158:2,11 163:20 164:5 164:12,13 170:12,20 245:14 246:7
light 73:7
liked 256:3
likely 90:19 94:25 96:9 97:9 136:5 201:23 281:9
likes 21:21
limitations 53:14 115:19 152:1 183:8 203:25
limited 89:12 90:5,11,15 91:19 92:7 94:18 98:1,3 107:15 142:24 143:3 156:1 159:6 177:2,8 182:12 184:16 246:16 247:9
limiting 244:14
line 59:13 66:12 73:4 105:15 111:15 131:14 150:4 157:14 177:12 202:14 210:19 213:15 213:20,22 214:12,13 233:24 284:2 293:9
linear 186:12 186:13
linearly 186:2
lines 69:3 106:1 194:7 225:19 266:25
linked 61:16
list 4:13 10:17 31:1,3,9 38:9 39:6,10 44:20 44:23 51:16,19 55:10 78:20 79:21 80:6 83:3 101:16 102:2,7 102:14,19 112:25 113:18 127:12 207:19 207:22,23 231:12 247:23 271:20,24 272:1,11,12,13
listed 22:2 26:19 29:7,16 33:19 38:6 55:18 80:17 231:17
listing 34:7 59:24
lists 50:9 79:20
literature 27:17 27:21 28:16 67:3,9,24 80:14 87:23,25 90:14 114:6,19 115:5 116:23,25 122:9 196:22 197:19,22 203:12 228:6 228:20 263:23 286:15
litigation 1:9 8:14 11:18 13:13 15:14,18 15:21,23 16:17 17:10,23,25 29:15,22 30:4 32:7,8 33:22 54:10 114:7,8 116:4 118:17 119:6,11,22 139:13 208:1 231:15,20 233:1,6,21 263:23 264:2,4 264:12,22 270:7 275:2 292:5 293:4
little 13:3,19 23:20 64:2 68:15 72:20 106:16 118:16 143:18 162:2 177:14 189:22 197:21,23

198:1 201:22 204:18 252:2 255:22
live 13:19
living 254:23
llc 8:8
llp 2:3,19
local 282:16 283:18
locations 286:13
long 48:10 86:14 109:22 144:10,14,17 144:19,20,22 144:24 145:1 145:24,24 146:1 147:6,16 147:21,21 148:14 150:17 152:7,7 209:10 233:17 264:24 271:16
longer 153:17 155:20 209:15 210:5
longo 68:24 72:7 74:6,15 280:22
longo's 78:23
look 12:17 18:8 25:2 26:17,22 28:1,20 29:4 30:11 31:10,19 34:24 40:2,3 42:4,4,9 44:6,8 44:19 55:10 57:13 58:17,18 60:5,9,10,15,19 60:23 61:5 65:16,19 66:14 66:19,24 70:3 74:16 79:11 81:7 82:21 83:3 83:14 84:14 85:8,17 86:6 88:18 97:12 98:13 101:5,16 102:20 104:3,6 105:3,14 107:8 108:11,14,20 109:15 110:3 110:19 111:24 115:18 118:6 120:12,13 123:2,4,7 124:7 124:17 125:15 126:16 127:9 128:14 130:7 131:10 133:25 136:25 137:4 140:2 142:19 142:20 143:15 145:6,13 146:1 146:21 147:3,6 148:24 149:7 151:22,23 152:18 153:7 154:21 155:23 156:2 157:13 158:3 159:15 160:2 162:22 162:25 164:2 167:23 168:15 169:16,22 170:5 173:17 176:18 178:12 178:12 179:17 181:6 183:4,8 184:16 185:22 188:2,8 190:17 191:10,22 193:1,19 194:1 195:10,24 197:9 198:5,18 199:7,8,11,15 200:2,2,18 201:18 202:11 208:16 210:23 210:24,25 216:24 218:12 219:4 220:9 222:14 224:8 226:4,13 227:8 228:1 229:18 231:11,11 233:24,25 235:14 236:14 238:4,8,17 239:6 241:12 243:10,14,24 244:11,19 247:19,25 248:14 251:3 253:20 254:8 254:24,24 255:14,16,19 255:21 257:6 262:5 264:2,3 268:1,2 270:2 270:13,16 271:19 272:25 273:5 274:5 284:14 288:23 288:24
looked 12:4,6 36:24 37:7 45:13 53:11 122:10,16 129:14 133:22 144:7,8 183:4 208:8,9 223:23 232:13 271:8 288:7,7
looking 42:16 44:3 56:2,5 64:12 66:8 83:13 107:10 112:6 113:10 123:13,13 125:15 129:13 144:5,10 158:7 167:21 168:5 180:16 189:2 192:10 201:1,4 202:16,20 211:1 227:16 232:6,15 235:9 242:8 246:11 250:22,23 254:20 256:11 290:17
looks 18:12 19:20 23:4

24:17 106:17 188:21
lopes 1:24 291:3,24
lose 39:4
losing 107:13 269:11
lost 146:16 180:7
lot 26:10 43:3 51:1 64:21,24 86:12 87:9 191:2 201:5 212:4 223:10 226:2 270:7
lots 203:9 267:12
low 96:7 97:21 97:22 150:24 189:18 192:22 200:7,10,25 201:4,5,19,20 202:1,21 203:12 237:2 239:19,25 247:13
lower 146:9 147:20 148:15 148:19 150:25 151:7,12,16 161:13,17 172:13 210:3,6 210:11,12,16 210:18
lowest 194:10
luis 3:3 41:9,11 47:20 52:7 57:6
lunch 117:8 118:16
lung 40:19 41:2 267:24 277:1 277:18 279:2 279:23 280:6
lymph 229:1
lynch 46:5,8,12 46:13 47:17 233:14
lyons 3:4

m

m 5:8,10,16 7:6 104:1 117:14 138:6 270:4 285:11
m.d. 1:17 4:3 4:15,20 5:5,19 5:20 7:5 8:1 34:18 42:8 57:9 154:7 170:1 283:5 292:1 293:5,23
m.p.h 1:17 4:3 8:1 34:18 42:8 57:9 292:1 293:23
m.p.h. 154:8 293:5
m.p.h..... 5:19
m.p.h.....34 4:15
m.p.h.....42 4:20
m.p.h...57 5:5
made 36:25 91:9 146:4 204:6 251:21 277:7 291:12
magnitude 124:24 125:1 126:3,3
main 79:24 181:22 253:21 253:22 257:25 258:6,18 259:19
maintain 202:5 203:1
major 121:12 159:8
majority 64:22 78:21 99:23 260:20
make 8:21 13:16 25:18 27:6 54:22 56:4 56:8 63:8 64:4 70:16 78:12 82:16 86:6 91:7 91:25 93:1,23 111:25 154:18 183:14 199:24 200:5 223:7 250:20 251:19 251:21 264:8 267:20 271:13 292:18
maker 201:13
makers 199:21 201:14
makes 43:14 52:5 129:23 130:10 148:21 233:18
making 56:7 92:25 120:14 185:4 201:14 211:3
malignancy 245:8
malignant 270:21 271:3,9 271:16
management 8:8
mandate 24:10
manufacturer 115:1
manuscript 232:15
manuscripts 264:3
mark 9:24 10:4 34:15 42:5 88:8 103:21 117:12 133:5 138:4 154:5 169:20 169:25 179:14 207:2 248:11 269:7 283:4
marked 9:7 14:1 18:9 31:1 34:18 37:12

41:8,16 42:8 47:23 52:7,10 57:5,9 84:3 86:17 104:2,4 117:15 121:25 127:3 133:8,9 138:7 154:8 170:2 179:16 187:20,23 191:13 207:5 219:16,19 220:10 221:5 227:11,15 230:24 231:1 248:13 269:17 275:23 276:3 283:2,3,6,10 285:5,12
markers 274:2
marketing 1:7 292:4 293:3
martin 2:20 4:6 7:9 8:5,7 10:1,4 14:7 17:8,16 18:5,8 21:4,6 30:24 34:15 37:11 39:18 41:8,13,19,22 41:24 47:20 52:6 57:5,19,25 58:4,14,18,22 58:25 59:6,15 59:18 61:24 64:6,9 69:16 70:2,13 77:14 77:24 83:9,12 83:17,23 85:15 88:8,14 92:22 98:17,20 103:4 103:9,18,21,24 105:19,22 106:1 110:22 115:22,25 117:8,11 120:1 124:22 126:21 127:6 129:25 130:4 132:15 133:5 136:24 137:23 138:2 138:14 140:1 140:20 146:25 154:1,4,15,20 157:16,19 159:18,25 161:7 166:11 166:14 169:20 169:24 175:7 175:16 176:21 176:23 177:2 180:9,11,13 184:8,11,21 187:20 207:2 218:1 219:7,10 219:14 225:11 230:20 239:13 248:4,7 262:7 262:10 265:10 269:8 275:4,7 277:10 281:18 283:7,25 284:23 285:1 287:15,18,21 290:19 292:11 293:25
mas 1:8 293:3
mash 182:1
massachusetts 1:21 2:22 13:20 17:5 118:4 291:5
material 148:21 149:25 150:3,10
materially 125:19
materials 10:11 11:10 69:16 79:2 118:7
math 15:4
matter 35:18 35:23 120:18 200:8 210:20 264:7
maximal 136:4 136:7
mcl 274:19
mdl 1:7 8:11 15:14 58:10 274:16 293:3
meagher 2:19
mean 16:1 17:2 20:10 21:13 27:4 30:13 31:8 31:8 34:7,9 37:8 40:11 42:19 45:6 46:2 46:25 47:12 49:2,7,20 51:21 53:3,4 54:15 55:2,9 60:6,10 60:23 61:17 62:10 63:14,15 63:20 64:18 67:13 69:11,20 73:5,8,16,25 74:3,14 75:7,16 76:10,19 78:24 81:7 82:6,13 83:2 84:13 87:13 89:18 90:3,7,17 91:4 91:23 94:17 99:7 101:13 102:1,3 107:9 108:1,11 109:9 110:10,12 111:16 112:5,7 112:15 113:7 113:19 114:10 114:22,23,24 115:18 116:6,8 116:18,19,24 117:6,25 120:2 120:15,23,25 122:4,10,20 124:17 125:4 125:24,24 127:18,19 128:4,5,7,8 129:2,20 130:16,19,22 132:19,23 136:20 137:16 139:14 143:12

144:14 145:25 146:14 147:23 148:7,22 149:10 150:8 152:17 153:22 154:13 155:5 160:4 161:23 162:10 163:24 168:10 169:11 171:25 172:25 173:9 176:12 176:24 181:16 183:11 184:3 185:22 186:13 186:20 187:8 190:5 192:10 192:20 193:8 195:7 196:25 204:21,23 205:19,24 206:1,3,10,14 210:11 211:17 214:13,22 218:12 220:18 222:9 223:3 225:14 226:3 226:21 228:23 228:24 229:1 230:6 233:17 233:20 234:12 236:25 239:3 239:17 242:19 244:18 245:15 247:25 252:16 254:6,23 255:1 256:6 258:18 260:3,23 261:18,21 262:24 263:11 263:20 264:1 266:6 267:18 267:23 268:1 271:11 273:14 274:3 280:8,10 280:15,19

meaning 39:16 204:15 216:15 225:21

means 93:14,16 95:20 98:14 128:8 201:19 251:18 273:21

meant 41:6 77:24 244:4

measure 147:25 148:5,6 185:12 198:3 288:21

measured 146:20 148:8 263:9

measurement 104:9

measures 106:4

mechanism 76:16 89:25,25 90:8,13,20 168:5 226:15 282:6,24

mechanisms 81:20 89:21 90:10 168:1,2 287:5

mechanistic 64:25 204:24

median 136:7 142:15 160:19

mediating 96:21

mediators 282:17 283:19

medica 269:19 269:25

medical 19:13 19:21,24 20:10 20:12 33:7 62:14

medically 148:24 149:4,7 150:19

medicine 18:23 19:8 23:7,10 261:12

medium 237:3

meet 246:1

meeting 11:10

member 24:18

memorializing 21:9

mental 15:4

mention 76:6 152:15,20,24 170:18 193:12 245:16,17,18

mentioned 22:8 28:14 65:4 69:10 74:8,9 88:10 89:24 126:6 145:2 152:16,21 159:7 166:17 182:2 183:20 202:12,23 205:7 210:13 227:7 231:25 254:25

mentioning 166:22

mercifully 48:11

mesothelioma 35:8 277:1,17 279:2,23 280:6

mesotheliomas 266:3

met 11:1 91:9 243:21 252:4 259:6

meta 26:10 44:24,25 45:7,8 45:14,15,16,23 45:24 46:13 81:16 84:5,11 85:7,23 101:24 183:21 184:1 188:10,23 189:5,12,15,17 190:2,9,10 198:3,8 199:8 221:16,18,21 221:23,24 231:5,19,24 232:14 234:24 235:2,8,10

245:19 246:15 247:17 248:10 250:19 251:3 251:12,19 253:21,23 255:13 256:1,4 257:8,11 258:24 281:16
method 135:24
methodologic 121:13
methodological 121:9
methodologic... 191:8
methodology 43:21 44:2 63:4 63:13 64:14,15 74:3,16 114:24 116:11 117:1,3 208:9,17 233:12 244:11
methods 72:11 110:12 113:10 115:8 118:7 206:21 244:15 244:19 245:12 251:16 270:14 285:23
meticulous 206:5
metric 194:19 194:23 195:1
metrics 150:16
meyers 18:22 19:12
michelle 2:4 289:8 292:9
microscopy 73:7
middle 153:11 166:3 189:9 217:22
migrate 229:10 283:16 284:20 284:22
migrated 229:14
migrates 287:6
migration 76:7 93:7 168:2 173:16 227:1 227:20,24 229:8 284:13 287:7
million 140:14 158:23 177:23
mills 194:24
mind 83:1,21 93:12 173:5 175:6 272:23
mined 286:13
mineralogist 69:2
minerva 269:19 269:23,24,25
mini 42:11
minimal 136:4 136:7 197:16 251:11
minor 182:5,6
minus 255:20 255:21
minute 38:1 109:18 169:22
minutes 269:1 271:19
minutia 225:13
mirrored 281:5
mis 148:8
misclassificat... 131:2,6,20 132:10 168:24
misclassificat... 132:24
misconstrued 198:1
mish 182:1
missed 104:12 286:7,9
misstates 28:11 36:1 44:15 49:18 50:6 60:3 65:25 75:14 92:21 93:20 122:16 141:9 141:24 150:6 167:15 205:13 231:23 232:10 242:18,25 252:6
mistaken 103:1
misunderstood 175:8
mode 136:8
model 93:7,13 93:13 287:4,8
models 92:9,19 93:2,3,18,21 284:3 287:5
moderate 162:8
modifiable 40:14,21,23,24 41:5
mohamed 6:4 191:12
molecular 99:1 265:17,23,24 266:6
moment 82:25 98:18 101:19 137:24 224:13 244:8 262:8
moments 149:24
monday 10:18 13:25 18:11 69:17 103:13 133:15 272:7 272:13 284:24 287:23
monetary 18:3
money 15:22 15:23
monographs 25:8,10
month 18:12 145:13 216:11 248:22 249:2 249:13,17,20 250:5
months 106:7 106:23 144:23

145:10 146:2
moore 285:9
moorman 11:25 207:25 208:13 263:16
moorman's 207:19
morning 8:6 12:20 213:14
morphologic 99:2
move 18:6 30:24 92:2 136:22 138:3 215:8,18 219:15 232:23 232:24 240:15 244:5 263:12
movement 228:4,19,21
moving 73:18
mparfitt 2:8
mucinous 192:7,16,22,25
muffled 21:3
multi 245:10,16 246:10 247:18
multicase 27:21
multicausal 101:6
multicounty 8:14
multiple 60:25 80:9,22 165:4,9 165:10 224:6 231:8 244:20
245:3 287:5
mutagenic 93:9 227:4 282:18 284:6
mutations 99:1
myeloid 32:20

n

n 4:1 5:1 6:1 7:1 28:3 177:5 177:7 184:24 185:19 196:4 196:15
n.w. 2:5
name 8:6 19:25 73:8 91:7 185:25 207:19
napkins 245:7 285:25
narod 5:23 178:8,14,18 179:13,15 180:3,21 182:18,23 185:10 272:16 273:2,3
narrative 81:24
national 4:17 21:18 41:15,25 42:16 241:4
nature 31:13 32:12 99:13 137:21
nci 87:16 120:16
near 184:14
necessarily 30:15 43:19 45:6 55:20 63:7 67:23 90:17 96:5 165:24 201:12 278:4
necessary 76:3 276:21 292:19
need 26:22 40:3 59:18 65:9 88:14 92:2 142:20,22 153:10 176:9 179:25 180:1 180:19,20 181:20 182:19 268:6,7
neighborhood 15:10
neither 172:7 173:6
neutral 116:15
never 13:20 34:11 56:21 110:16 163:9 163:12,16 198:8 232:25 233:3 252:18 252:18
nevertheless 170:25
new 1:4 8:14 19:2 21:22 42:25 65:23,24 66:4 79:13 118:1,4 121:14 154:5,13 156:19 168:16 168:17 260:13 260:14 261:9 271:19 274:19 274:21 293:1
newcastle 236:21,23 237:6,17 238:15,19 239:6 240:8,11
newer 246:24
nhs 143:21 144:16 155:25 156:16 159:3 251:6
nhsi 156:21 167:23 177:17 181:10
nhsii 143:22,25 144:19,21 155:25 156:12 156:18 158:22 159:4,8 160:12 164:2 177:18 181:4,8,9,12,25 182:3
nicolas 5:6 86:16
niehs 138:21
nih 21:16,17 120:16
nod 8:20
nodes 229:1

noise 125:21,22 125:24
non 17:22,25 29:21 35:6 94:9 111:25 112:4 170:10 173:4
nonexposed 128:20,24 129:3
nonintact 137:8 170:25
nonobese 96:9
nonpatent 141:14 170:9 171:9,18,22,25 172:13,17 174:2,13,15 219:3 286:19
nonrelevant 81:5
nonsignificant 171:22 212:16 218:13
nonusers 174:21 241:20
nos 238:14
notable 99:16
notary 8:2 291:4,25
notations 292:18
note 21:3 99:17 99:18 114:16 121:17 126:17 158:6 159:13 160:19 228:23 251:13 292:16
noted 68:5 75:10 78:6,9,10 152:22 154:25 155:4 159:25 164:11,14 189:4,4,11 190:1 214:22 235:21 280:19
notes 98:18 169:22 227:17 275:5 291:16
notice 4:10 9:7 9:22 122:2,6
noting 290:15
notoriously 213:24
novel 27:11
november 14:25 35:1 37:20 61:10 272:5
nuance 282:23
nuanced 274:13
null 214:11 261:23
nullified 127:25 128:4 130:25
nullify 131:21
nullifying 127:16
number 15:2 16:5 42:13 49:25 50:9 112:7 137:2,16 140:5,12 143:8 145:18,19 148:1,2,4 150:23 151:2 155:21 158:21 177:4,6 179:5 180:4 184:23 185:6,18,25 186:21 187:3 187:13 190:13 199:4 227:9 238:6,7 242:2 242:15 256:23 265:15 272:18
numbers 107:12,24 109:10,16 123:24 124:16 129:21 135:8 142:20 150:23 158:7,9,17 173:13 177:16 178:10 181:21 186:23 192:21 253:11
numerical 115:20
nurses 155:12 157:21,23 158:1 236:6
nursing 20:13
nutritional 224:16

o

o 285:9,9
o'brien 5:9,17 7:7 44:25 45:1 46:21,22 64:24 69:5 86:18 87:8 88:9 91:5 101:23 102:9 104:1,3 129:17 129:18 136:23 138:3,6,17 141:11 148:23 153:2,7,21 154:9,11 155:14 156:19 157:22 160:8 160:13,23 161:24 162:1 163:4 164:16 166:24 169:18 177:7 178:23 178:24,25 181:1,3 182:14 206:22 210:19 211:17 226:23 229:12 235:23 236:8,12 237:18,20 240:23 241:3,5 242:12 246:15 251:9 254:11 255:5,9,21 257:21 258:4 258:14,21 259:5,20 260:1

282:22 283:2 283:11,20 285:8,11,18 286:20 287:3
o'brien's 177:12 218:9 235:3 236:5 259:22 288:8
oath 291:9
ob 38:16
obese 96:8,16 97:9
obesity 96:14 96:18,19,21 101:17,20 224:25 225:6 226:8,10
object 8:25 9:1 17:11,13 93:19 122:15 137:14 139:17 213:18
objection 12:12 15:25 16:6,10 16:14,18,21,24 17:6,24 25:9 26:21 27:22 28:10,17 30:7 31:25 32:4,23 33:5,15,20 35:19 36:1,17 36:22 37:6 40:10,17 41:3 44:12,14 45:25 46:11,23 47:11 48:25 49:18 50:1,6,24 51:6 52:25 54:2 55:1 56:15 64:17 65:11,25 67:6 71:17,23 75:4 75:14 77:8 87:12 88:5 89:17 90:16 91:21 92:20 93:19 95:5 96:11 97:10 100:5 107:4 112:13 116:5 116:17 117:5 119:15,24 120:10,22 121:1 123:23 128:11 129:1,7 130:15 132:18 139:17 141:9 141:23 146:11 147:13,19 148:17 149:15 150:6,22 151:17 158:13 162:5,18 163:13,21 167:15,20 169:8 173:8 174:5 176:1,7 190:16 191:7 192:17 195:6 205:13,25 206:9 208:6 209:1 211:22 213:1 225:24 229:17 230:13 231:21 232:2 232:10,19 233:8 234:11 235:12 236:7 239:2 240:9 242:1,17,25 243:3,8,23 246:8 247:10 252:6,14 254:1 254:5 255:7 261:2 263:25 264:14 267:7 268:14 270:10 271:5 273:15 277:10 290:2 290:12
objections 9:22 10:2,7 21:8 291:11
objective 56:13 56:14,19 236:23
observation 186:23
observational 179:22,24 200:7,8,10,11 201:2 203:11
observe 271:3
observed 94:22 98:25 110:20 111:1,6,8,12 162:15 211:13 213:3 215:22 215:25 216:2,5
obtain 292:10
obtaining 261:22
obviously 28:4 39:10 44:4 60:7 62:23 68:24 74:13 112:24 115:8 116:12 120:19 133:14 150:14 155:23 158:20 161:24 181:5 237:4 267:24 270:13
oc 224:18,22,24 225:2 282:14
ocac 45:11 46:25 268:2
occur 94:22 131:18 271:9 271:10 274:7 286:8,11 290:16
occurred 156:16 232:12 232:13
occurs 164:5,6 255:23
october 18:20 43:15 291:25
ocwaa 45:11 47:1
odds 126:8 127:24 128:8 137:7 163:19 191:20 211:9 221:18 222:4,7

222:12,15,16 222:24 223:1 223:11 242:24 243:6
offer 62:2 73:22
offering 8:13 35:5,12 68:1 76:2,7 274:23
office 58:21
ogunsina 7:5 102:9 283:2,5 283:11,20 287:19
oh 191:1
okay 8:17 9:10 9:14,20 10:10 11:9,12,16,20 12:9,17 13:4,12 13:18,23 14:16 14:20,23 15:8 15:13,16,21 16:5,23 18:15 18:19,24 19:7 20:2,14 22:8 23:1,3,12 24:4 24:19 25:1,6,13 26:15,24 28:24 29:10,18,21,25 30:3,11,21,24 31:6,11,20,23 32:19,25 33:2,7 33:11,17 34:3 34:14 35:8,12 35:15 36:11,24 37:3,10,22 38:4 38:12,15,20,23 39:2,15,22 41:12 42:4,25 43:4,17 44:19 46:8,20 47:5,9 47:20 48:2,6,14 48:17,22 49:9 49:13 50:2,3,9 50:12 51:10,13 51:15,20 53:1 54:7 55:4,7 56:4 58:16,16 61:10 62:4 67:3 70:21 71:8,14 71:25 72:24 73:3,15 76:1,6 77:6,10,19,21 79:16 80:7,17 84:8,9 85:19,25 86:14 88:7 89:6 90:4 92:17 94:4 97:5,20 100:1 100:10 101:10 101:23 102:13 102:18,24 104:18,22 105:3,12,24 106:25 113:15 114:4,18 115:14 118:13 118:16 119:5 119:21 120:5 122:14,24 123:7,10 124:7 124:8,13,20,25 125:23 126:14 128:18 129:5 130:18,24 131:5,25 132:5 132:22 134:11 136:22 137:10 138:16 139:21 140:7,15,23 142:7,11 144:10 146:8 147:9 148:23 149:7 150:15 151:5,10 152:6 152:19,25 153:7 154:17 155:9,12,19 156:13,21,24 159:11,13 161:4 164:9,25 168:25 169:20 171:4 172:23 173:2 174:9,16 175:12 176:25 182:8 183:10 184:16 188:6 188:19 189:2 190:10 192:3,4 194:1,8,9 199:2 205:4 207:2,11 207:15 208:23 209:17,18 210:2 212:9 215:18 217:19 220:23,25 221:4,8,11 223:18,25 228:1 233:5,17 234:6,7,17,23 236:14,16,21 237:19,23 238:25 239:6 239:16 241:19 242:8,13 243:18,19 244:4 246:19 247:22 249:1 250:8,15 254:22 255:3 256:10,25 257:6,11,19,23 260:13,16,25 261:17 265:11 266:21 268:24 270:3,20 271:2 271:22 272:9 276:14 278:15 279:13 285:17 288:23 289:5
old 154:13
older 247:1
once 190:24 245:23 284:4
oncologist 274:5
oncology 86:22 86:24
ones 22:1 79:19 79:23 143:15 212:5 246:22 246:22 255:24
oophorectom... 156:3,10

oophorectomy 156:5,7,15
open 74:10
operational 87:23 95:12,23 96:1
opined 279:17
opinion 12:15 31:16 32:12 35:5,12,24 36:3 51:11,23 52:2 52:22 53:8 57:1 57:3 60:18 65:6 65:22 66:6,6,7 66:10 68:2 73:22,24,25 76:2,8,13,17,19 81:24 82:3 94:8 94:18 99:9,13 99:14 115:17 146:4 176:14 197:19 203:21 203:22 204:1 224:2 225:20 226:7,10 255:4 261:6 267:15 267:15 268:20 268:21 274:23 277:7 278:2 280:3,25 281:4 281:6 283:21
opinion's 68:4
opinions 8:9,13 12:22 30:1 31:13 35:20 61:11 62:1 102:4 135:1,3,4 141:25 267:19 272:10 277:25 278:1 279:6 280:16 285:15 285:19 287:1
opioid 264:3
opioids 264:23
opportunity 148:12
opposed 53:9 108:9 259:11
opposite 164:14
optional 114:11
options 145:8
oral 48:23 164:4 237:11 245:18 274:1
oranges 258:14
order 4:23 52:1 52:3,9 54:8,12 54:18,25 55:3,5 55:19 57:15,22 179:19,23 180:14,18
ordinary 40:16 87:24
organization 36:21 38:13 48:3,4
organizations 36:15
origin 98:25
original 25:20 25:21 26:5,11 28:25 80:25 81:25,25 84:7,8 84:10,17 86:1 101:25 102:3 113:10 145:14 258:6,10 259:19 292:8 292:11
originally 26:13
ors 134:15
os 143:21 144:19
ottawa 236:21 236:23 237:17 238:15,19 239:7 240:8
ou 33:7
outcome 27:25 53:23 54:1 95:13 101:1 104:11 136:5 223:2 239:4 287:25
outcomes 185:12 288:21
outline 88:16 287:8
outlined 113:10
outlines 195:12
output 27:7
outreach 36:14
outside 13:20 15:14 29:14 30:3
outweigh 279:25
ovarian 12:23 22:6,13 29:12 29:15,19,22 30:5,18,22 35:4 35:6,13,15,18 35:21 36:4,6,15 37:5,24 38:10 40:7,25 44:13 45:4 46:9 49:15 50:5,14 76:4 84:1 85:10 86:19 89:11,16 89:22 91:13 92:9,19 93:18 94:24 96:23 97:23,25 98:9 98:23 99:6,10 99:13,23 100:11 101:5 101:18 105:14 106:5,12 107:10,15,23 108:16,18,21 108:23 109:3 110:7 111:10 111:20,22 112:8 113:1,3,5 113:11,22 114:12 117:13 118:3 123:8 133:11 138:24 141:13 142:16 142:18 143:10 152:12 154:25 156:6,7,8,11,25 158:25 163:6

164:11 167:5 168:13 171:13 173:25 174:20 177:4,7,10 178:8 184:23 187:5,6 189:6,6 189:13 190:5 192:19,25 193:10 196:18 204:3 208:11 214:18 216:8 216:18 220:4 226:1,11,15 229:7 231:10 234:7,21 241:25 260:20 265:23 266:1,4 267:20 268:13 268:22 273:10 274:24 275:17 277:1,18 278:3 278:10 279:2 279:12,24 280:6,10,13 281:1,11,15 282:6,15 285:20 286:17 288:19 290:15
ovaries 76:8 228:25 229:15 229:22 230:3
ovary 48:15
overall 45:18 53:7 99:14 124:16 146:12 146:13 171:10 172:14 174:14 278:2
overlap 197:7 197:17 211:17 212:5
overlapped 210:20
overlapping 210:10,14 218:25
overlaps 211:19
overweight 224:25 225:6
overwhelming 99:23
own 65:15 190:15 263:10 286:17 287:10
oxidative 282:16 283:18

p

p 6:6 161:11 165:2 173:17 207:4 212:23 212:25 213:3,6 213:7,9,15,20 214:2,4,5,5 218:12 220:5 261:15,20,20 261:21
p.m. 290:23
page 4:5,9 5:3 6:3 7:3 9:12 18:17 19:17,19 21:1,11,12 22:17,17,21,21 23:3 25:7,13 26:24,24 28:21 30:11 37:14,17 37:18,22 42:9 42:10,10,13 43:5,9 48:12,15 49:9,10 52:11 52:12 53:18 59:9,10,12,19 62:6,7 66:12,14 66:17 67:1 68:19 74:18 79:11 81:10 85:18 88:18,22 89:3 97:17,24 98:21 104:12 104:13,13,14 105:13,16,17 110:21,22,23 118:7,18 121:21,24 123:3 127:8,9 128:15 133:24 134:1 136:2 137:15,16,17 140:3,16,20 144:5 149:4 151:23 153:7 154:21 155:4,8 157:8,8,13 159:19,21 160:3,5 161:4 161:12 163:3 164:9,16,18 166:1,8,12,23 168:15 170:5,6 175:1,2,3 176:18,25 178:13 179:18 179:20 180:9 184:17,20 188:2 191:15 191:23 194:2 195:24 196:3,9 196:10,11 200:19 202:12 202:17 206:3 207:9,10,11,20 209:3 212:10 214:24 215:1,9 215:15,19 217:19 218:1 219:20,25 220:10,22 221:5,8 224:9 224:10 226:13 227:21 228:3,9 228:10 229:19 231:3,3 235:14 236:14 238:9 238:11,18 239:12,13 244:16 248:15 255:1 256:23 260:7,12 262:6 265:8,12 266:9 266:16 270:2 270:16 271:23 273:7,8 276:16 277:12,14,19 278:12 279:14

279:18 281:25 283:23,25 284:1,15,15 285:21 288:24 288:25 289:1,5 289:7 292:9 293:9
pages 1:1 38:17 43:13 44:7,7 121:11 126:18 156:22 159:17 195:25,25 207:6,13 257:4
paginated 37:13 43:14 48:11 88:10,15 256:24
pagination 104:14
paid 31:24 32:22 116:3 270:5
pains 292:21 293:6
papantonio 2:11
paper 54:16 69:6 76:12 86:12 91:5 93:5 103:23 116:15 121:5 135:2,6 208:4 232:1,7,9 272:16
papers 116:20 116:21
par 98:10
paragraph 44:8 49:10 52:14,20 74:20,21 88:19 89:3,4,6 91:10 92:4 93:22 97:16,20 104:7 104:8,17 105:4 105:23 107:9 110:20 111:2,3 111:3 128:16 151:25 153:13 155:4,7 160:17 161:1,11 164:18 166:3 166:12 170:6,8 170:18 178:13 179:18,21 180:11,16 188:8 189:2,9 191:18 196:4 202:15,16 204:5,9 209:3 212:8,12 215:16,20,20 215:24 217:21 217:22 218:2 219:25 224:9 224:11 226:14 228:3,15 229:18,19 230:1 231:2 235:15,18 244:22 257:7 260:8,10 262:12 263:12 265:15 266:11 266:19 273:1,6 273:7,8 278:21 284:17
paragraphs 48:14 134:3,6
parentheses 171:8 213:3
parenthetical 263:15,16
parfitt 2:4 4:7 8:25 9:21 10:3 10:17 12:12 13:25 15:25 16:6,10,14,18 16:21,24 17:6 17:11,20,24 18:7 25:9 26:21 27:22 28:10,17 29:4 30:7 31:25 32:4,23 33:5,15 33:20,24 35:19 36:1,17,22 37:6 38:2 39:16 40:10,17 41:3 42:12 43:7,12 44:12,14 45:25 46:11,23 47:11 48:25 49:18 50:1,6,24 51:6 52:25 54:2 55:1 56:15 59:13,16 60:3 61:7,23 64:1,7,12,17 65:11,25 67:6 68:10,14,18 69:18,22 70:8 71:17,23 72:19 74:8 75:4,14 76:15 77:8,13 77:22 80:3 81:10 82:25 83:16,20,24 85:14 87:12 88:5,17,22 89:17 90:16 91:21 92:20 93:19,25 95:5 96:11 97:10,14 100:5 103:12 105:18,20,25 107:4 108:6 109:20,25 110:21,24 112:13 116:5,7 116:17 117:5 119:15,24 120:10,22 121:1 122:15 123:23 124:21 126:17,25 128:11 129:1,7 129:16,24 130:15 132:13 132:18 137:1,3 137:14,25 138:13,15 139:16,22 140:18,22 141:9,23 146:11,24 147:13,19

148:11,17
149:15 150:6
150:22 151:17
153:10 158:13
159:17,19,23
160:2 161:6,8
161:23 162:5
162:18 163:13
163:21 166:9
166:15 167:8
167:15,20
169:8 173:8
174:5 175:2,5
175:10,13,15
176:1,7,19,22
176:25 180:7
180:10,12,15
184:19,22
188:3,6,15
190:16 191:7
192:5,17
193:20 195:6
196:7,9,12
205:13,25
206:9,11
207:17 208:6
209:1 211:22
213:1,18 216:4
222:19 225:9
225:24 227:13
228:11 229:17
229:24 230:13
230:19 231:21
231:23 232:2,4
232:10,19,22
233:8 234:11
235:12 236:7
238:7 239:2,12
240:9 241:1,11
242:1,17,25
243:3,8,23
244:14,25
246:8,20
247:10 252:6
252:14 254:1,5
255:7 259:9
261:2 262:4,20
263:25 264:14
265:9 266:15
266:20 267:7
268:14 269:9
269:14 270:10
271:5 272:21
272:24 273:4
273:15 275:10
275:13 281:20
283:3,8 284:25
285:2,4 287:13
289:10 290:2
290:12,21
292:9
parfitt's 21:8
parity 157:14
237:9,10
245:17
parsing 150:8
part 6:19 9:24
10:5 52:22
99:13 105:12
121:23 122:19
122:21 170:17
275:11,25
276:4 289:2,22
289:24
partially 56:13
56:14
participant
110:15
participants
132:9 241:4
particle 226:25
283:24 284:3
particles 228:5
228:19,22
229:10 230:3
286:2 290:6
particular 51:7
51:8 54:12
55:25 56:1
99:20 104:6
203:16 263:13
273:10,22,23
particularly
40:6 44:22
108:15 239:20
257:8 263:14
parties 291:18
partly 50:17
187:14 288:7
parts 12:18
197:14
passage 203:19
289:7,12
past 15:10
145:10 162:8
194:14
patency 168:20
168:22 169:2
244:13 245:14
246:7,12,25
247:1,4,6
patent 89:12,23
90:5,15,22
141:14 147:4
148:15 163:7
167:3,13
168:22,23
170:8 171:8,21
172:12,18,22
173:9,10,25
182:22 218:4,6
218:9,21,22
219:3 241:17
242:6,11,14,15
243:16 247:9
286:18 287:11
pathway 96:21
279:9,9,11
281:10
pathways 81:20
99:1
patient 40:16
40:20 162:11
patients 39:23
40:4 63:6,9
patrick 3:4
pattern 87:20
patterns 102:10
103:10 105:6
payment
121:24
pdq 4:18 41:10
41:15 42:1,22
42:25 43:1 44:9

44:16,18 47:6 256:13,19
peer 24:13 25:14,16 26:24 27:2 28:25 30:1 62:18 115:5,7 116:24 232:15
penalties 292:22 293:6
penalty 291:20
pending 9:5
penninkilampi 45:7,20 148:4 185:23,24 198:10,16 199:8 220:24 222:15 223:14 235:6 240:13 245:25 246:3 250:20
pensacola 2:14
people 19:14 51:1 108:5,8,18 109:3 111:24 129:3 139:24 162:7 208:15 223:21
percent 16:23 48:19 106:9,10 106:12,14 108:24,25 123:12,15,18 124:10,10 127:15,18 128:1,2,22 130:12,19,20 131:1,2,3,5,19 131:19,21 134:15,16 141:20 142:4 149:18,20 196:4,15 198:7 198:9,18 199:4 212:13,15 220:5,8 238:1 251:17 257:14
percentage 16:16 17:9,12 17:17 71:11 260:1,3
perez 219:4,11
perfect 43:12
perform 115:10 168:21 263:4,5
performed 72:14,22 73:9 231:20 263:1
performing 116:1
perineal 44:11 144:22 146:1 174:20 196:6 196:17,18 220:2,12 221:6 225:1 226:16 231:7 234:8,20 245:4 251:15 256:18 257:7 257:15 282:7 284:20
perineum 245:6
period 140:11 179:2 182:25 210:5 271:3
periods 143:9 177:22
peripheral 32:15
perjury 291:20 292:22 293:6
permit 262:14
peroneal 229:3 268:12 290:17
person 11:6,8 38:16 140:8,9 140:12 142:17 177:23 197:13
person's 27:8 274:24
personally 24:24 72:6 78:18 264:16
persons 197:13
persuasive 52:17
pertinent 277:12
pfas 280:1
pharmaceutical 203:15
phone 11:7
picking 269:10
piece 162:23
pile 34:20
pills 38:25
place 25:22 88:15 166:7 197:13 219:16 291:7
places 272:11 287:5
placing 52:22
plaintiffs 2:9 2:17 13:8 21:8 116:21 119:6 120:21 133:16 208:1 231:14 270:6 274:16 274:18
plan 61:11 62:1
plantation 1:20
plausibility 55:23 56:10,24 62:25 67:20 76:13 93:4 125:10 162:24 227:20 230:7 262:5 278:8
plausible 59:23 76:16 125:7 126:1 172:16 172:25 173:5,6 173:10,23 174:1,3,7 218:20 279:9
plausibly 285:24
play 94:5
please 8:19 9:1 21:1 108:6 116:7 130:4,6 159:15 175:7 178:3 188:4

212:7 243:9 262:20 273:16 281:25 292:11 292:16
plot 251:3 254:25 255:1
plus 15:8 194:9 242:3,3
point 11:16 12:13 27:12 56:23 67:3 78:8 86:5,11 88:13 90:12 91:22 109:17 119:8 119:10 134:13 136:18 137:10 137:12 142:12 143:4 145:21 146:9,9 147:20 148:15 149:2,3 150:14 151:7 151:10,14,16 176:14 182:10 194:10 197:3 198:15 201:10 209:18,24 210:11,14,17 210:23 212:6 212:22 215:15 234:10 240:4,5 244:12 250:25 260:23,25 275:8
pointed 157:25 167:11
pointing 143:16 185:17 189:3 192:21 193:24
points 56:22,23 62:25 185:11
polarized 73:6
polymorphisms 224:23
pool 197:7 199:12 251:16 252:22 253:17 253:18,22
pool's 156:3
pooled 26:10 44:24 45:1 46:21 81:16 85:6 140:25 141:4 143:16 144:2 146:22 159:8 178:25 181:1 182:4,9 182:14 183:6,7 183:11,12,16 183:16 185:8 193:5 198:25 212:15 235:2 235:22 253:2 253:10 255:9 286:20
pooling 183:9 185:1,20 222:8
poor 129:9
poorly 283:23 284:3
population 98:11 164:1 198:6 208:21 211:10
populations 163:25 197:4
port 136:10
portion 128:14 224:7 270:4 290:9
portions 52:4
pose 104:25
posed 276:23
position 54:9 177:11 212:22 283:15,20
positive 71:12 71:21 89:10,21 141:13 167:3 195:17 196:5 196:16,25 286:16 287:12 288:11
possibility 95:3 95:7 165:17 176:10
possible 90:7 96:8 97:8,8 133:20 170:8 202:5 203:2,18 203:21 204:16 204:18,20 205:1 206:18 286:16 287:11
possibly 94:5
post 178:5 190:21 191:9
postdate 22:10 22:18
postdates 138:3
postmenopau... 48:24 91:14,20
potential 118:18 120:24 121:1 165:3 228:4,18 229:10 277:23 279:11 280:1 289:16
potentially 79:21 111:11 154:15 286:4
powder 1:7 8:10 12:23 24:2 35:2,3 38:5,5,9 39:3,24 40:5 50:15 68:2 71:15 86:19 89:11,15,22 94:4,10,12,13 94:16,19,25 96:9 97:9 105:9 111:13 167:5 170:22 171:1 171:12 173:25 174:20 190:6 192:16 196:18 208:24 209:10 209:13 212:9 214:18 215:3 216:7,13,18 231:8 234:8,20 245:5 260:19

270:7,21 273:19,22 280:17 281:1 285:19 290:9 292:3 293:3
powders 97:25 170:13 214:25
power 151:4,5 151:12,16,19 153:2 158:10 158:12,15,16 158:16,17,20 176:10 177:3,8 177:11,15,23 178:5,11 179:6 184:17 185:9 185:13,14,16 185:17 186:2,4 186:9,11,19,25 187:11 189:15 189:18 190:9 190:11,14,19 190:19,21,25 191:2,3,9
powered 187:2 187:10
powerful 186:16,19 187:5
powers 158:17
practice 75:2 114:5,10 200:1
practices 1:8 292:4 293:3
preceded 153:1
precedes 105:23
precise 46:13 68:20 200:4 255:14 256:2
predicated 68:4 75:20 278:4
predicating 281:6
predict 26:9
predominant 114:23
preempted 250:10
premenopausal 91:14,19
prepare 10:20 11:2 18:2
prepared 18:4
preplanned 13:15
presence 68:5 69:1 72:2 75:20 196:5,16 280:23 281:6 289:18
present 3:3 62:20 68:6 111:11 158:25 277:22 289:16 292:13
presentation 191:25
presentations 30:12,18,21
presented 30:14 42:3 217:2 276:22 277:15
presenter 30:15
prespecified 163:6 165:20 168:3,4
prestigious 139:5
presumably 90:24
presume 195:16
pretext 64:8
prevalence 98:7 99:25 209:9
prevalent 285:7
preventible 98:14 162:12
previous 10:23 12:5 34:25 42:1 46:4 51:19,21 53:15,18 61:13 65:20 68:6,23 69:13 91:24 99:18 102:5 111:4 152:10 190:18 195:11 215:8,19 216:21 219:17 221:5 232:14 261:8,10 263:12,20
previously 19:4 111:12 117:23 285:14
primary 23:6 116:10 125:4 140:21 208:19 235:5 244:20 245:3 247:6 254:18 261:11
printout 4:16 4:18,22 37:12 41:15 47:22
prior 11:13 54:10,16 64:13 68:11 93:20 184:3 216:16 216:19 234:13 264:17 269:21 273:11,17
priorities 40:16
probability 214:7 261:22
probable 204:19,21 205:2 206:18
probably 15:4 16:11 21:19 34:20 70:13 86:9 90:19 108:1 133:2 148:1 188:24 201:9 247:25 272:22
problem 58:18 70:13 105:1 106:21 175:16

188:17
proceedings 274:21 291:6
process 24:11 56:12,13,19 93:16 137:22
produce 9:15
produced 9:17 10:7,18 13:24 17:2 18:3,10 133:15 134:21 264:2,5 272:13 284:23 287:23
produces 194:10
product 94:15 170:14 199:25 210:4 234:8
productively 183:6
products 1:7,8 32:6 35:2 105:7 129:19 173:25 292:4,5 293:3,3
professional 63:3,4,5 291:3
professor 18:18
profound 98:24
progesterone 224:21
programming 118:22
promoting 282:14 283:17
promotion 26:6
prompted 70:18
prone 152:22
pronoun 91:3
pronouncing 58:10
properly 291:8
proportion 110:4
proposal 21:24
propounded 291:11
prospective 131:15 179:22 179:24 180:19 235:16 257:13 257:20,24 258:8,17 259:18
prospectively 111:14
prostaglandins 282:18
prostate 31:21
protection 276:9,18
protective 50:9 137:21 149:19
provide 66:5 68:7 74:17 78:21 79:9 81:13,25 82:4 84:6 85:2,2,4 98:12 102:3 112:16 113:1,9 113:21 135:4 144:13,13,18 194:17,18,22 195:9 199:20 201:10 206:14 212:13 217:5 229:7 239:3 258:14 262:17 263:8 264:1
provided 11:25 12:1 32:9 52:17 67:16 70:9 79:3 81:12,18 84:10 89:19,20 118:2 118:21,23 119:18 121:14 193:6 195:22 201:6 223:19 240:23 241:6,7 258:9,10 259:2 259:5 262:17 264:22 272:4,6
provides 53:8 93:6 96:1 153:23 194:17 237:24 288:19
providing 61:18 173:20 201:13 236:17 282:22
public 8:2 30:4 30:8 36:14 58:7 98:1,3,16 162:10 273:18 291:4,25
publication 23:17 24:13 25:15,16 27:3 102:5,22 121:23 122:20 200:4,16 232:18 244:19 245:2 258:15
publications 25:2 26:7,16 28:25 29:7,16 29:19 63:12 241:10 244:10
publish 87:18 241:3
published 23:14 24:1,6 25:4,10 26:16 46:7 62:17 63:11 86:22 114:12 116:15 116:20 133:12 134:8 138:25 139:2,7 199:10 206:23,24 208:11 232:15 268:3 269:18 278:6
pubmed 114:1
pull 60:12 100:20,22 281:21
purported 12:22
purpose 208:19 234:18
purposes 208:18 277:7

285:14
pushed 213:14
put 48:6 51:10 86:5 103:13,14 110:18 114:4 120:4 122:20 135:17 222:3 240:17 287:21 291:9
putting 229:3

q

quadruple 157:5,23
qualification 176:24 286:18 287:11
qualifications 141:14
qualified 72:24 73:12 262:24
qualifies 249:13 250:6
qualify 89:18 248:23 249:4,6 249:15,22
qualifying 253:6
qualitative 116:1 240:11
qualitatively 60:2
qualities 240:7
quality 236:20 237:3,3,3,20 239:19 240:1 240:14 245:10 247:14
quantitative 19:9 56:20 57:2 62:24 133:10 240:10 256:6
quantitatively 115:11
quantity 72:4,4 76:3
queries 114:1
question 9:1,6 14:12 17:12,17 17:25 27:23,24 28:12 30:17 41:7,7,18 44:1 45:22 55:15 56:17 57:14,20 59:20,21,25 60:17 61:20 66:18 67:11 72:25 73:11 74:10,11 75:12 75:16,17 77:11 81:3 83:4,8 84:15 86:10 92:17,22 95:2 96:15 97:7,15 110:1,2 112:23 116:9 119:16 121:7 122:12 124:1 128:3,13 135:7 137:15 137:19,20 141:16 142:24 145:16 150:11 153:11 159:2 159:23 162:3 168:7 170:19 173:14 175:18 181:15 182:16 185:19 188:23 198:13 200:3 211:23 215:5,7 215:10,11,13 221:20 225:18 226:6 232:23 233:11 234:15 235:24 236:3,4 236:10 237:6 237:15 240:6,9 242:20 243:5,9 244:2,18 245:23 246:6,9 246:21 247:6,7 250:18,18 259:24 261:24 264:10,11,15 264:17,18,19 264:20 265:1 269:3 278:20 282:4,8 287:16
question's 9:5
questioning 73:5
questionnaire 106:8,10,15,19 107:3,19,20,21 108:9 109:1 110:13 145:6
questions 8:23 10:24 37:4 54:23 86:8 134:3 143:2 145:1,5,5 148:11,12 165:12 169:13 169:15 186:10 206:17 219:6 235:19 237:5 238:3 248:1 250:10 258:22 275:11,14,18 287:14 291:11
quick 70:3
quickly 130:5 235:18
quite 14:12 64:4 135:12 139:2 193:20
quote 216:19
quoted 128:15 178:11
quoting 203:24

r

r 5:20 28:3 170:1
race 211:12 212:14 213:2 213:13 253:13
rafferty 2:11
raise 151:10,14 151:16
raised 58:5
random 256:1
randomized 20:7 202:23

203:15
randomly 108:10
rank 56:6
ranked 54:8,18 54:25 55:5,18
rare 27:25 28:14 223:1
rarity 97:23,25
rate 13:7 48:18 49:6,8 63:23 209:14
rated 63:23 201:3
rather 134:14
rating 239:1,23 240:1
ratings 239:17 240:4
ratio 127:24 128:5,6,8 144:12,15,15 146:5 147:7 149:9,10 150:19 151:3 162:17 163:19 172:10,12 182:9 191:20 222:4,5,7,16,24 222:24 223:1 242:16 243:15 243:15 250:2 251:16
rational 56:9
ratios 44:4 126:8,12 137:7 143:16 164:7 172:17,18 221:18,19,22 221:25 222:10 222:12,15 223:9,12 242:10,21,24 243:6 246:2 247:14 253:14 253:15 288:12
rats 229:22 230:4,5
ray 73:1
rcts 202:22
reach 65:8,12 76:8 196:20 198:8 199:13
reached 205:11
reaction 227:3
read 10:22,23 44:23 52:1,3,4 73:16,17 87:9 88:12 106:20 109:18,21 122:3 131:22 132:5,6 133:18 134:2,23 139:9 139:10 149:11 161:22 170:17 176:2 189:22 196:25 205:16 214:23 216:4 224:13 232:25 241:1,2 244:1,8 244:17 264:18 268:25 278:19 278:20 282:10 287:24 289:8 289:13 290:22
reader 114:19 119:14,21,25 120:20,23,24 121:2 174:24 233:18
reading 74:4 130:2,3 292:15
real 287:8
realistic 128:25 129:6,9 130:13
realize 14:5
really 16:7 21:3 25:5 27:11 47:15 93:3,16 95:19 109:12 111:25 117:3 143:10,14 149:21 159:4 194:7 203:13 219:24 220:18 235:6 244:3 261:7 266:7 267:18
realm 27:5 116:19
reason 20:18 47:17 52:17 80:19,23 87:10 98:5 100:23 102:18 108:4,7 112:2,24 113:17 129:22 170:11 177:12 190:21 235:8 248:2 253:12 283:19 292:17
reasonable 129:4,10 130:23 131:6 132:10 133:1 192:24 237:8 271:9,12 280:3
reasonably 289:17
reasons 80:13 80:22 239:3
rebecca 231:13
recalculated 134:15
recall 11:11 16:22 20:16 25:3 26:18 31:5 31:10,15,17,17 32:5,9,11,24 33:6,9,11,13 34:7,8,13 37:2 37:8 39:24 40:1 42:2 43:17 51:11,21 70:19 71:4,13 98:13 104:10,23,25 105:6 110:6 111:10 112:1,3 112:24 113:2 113:19,24 127:16,23 128:18 129:3 129:12,21 133:10,21

134:12,15,16 135:7 152:16 152:22,23 158:20 178:7 187:16,17 282:3
recalled 104:9 129:20
received 15:22 15:23 31:8,9 33:12 58:6 79:2 230:4,5 237:16
recent 32:8 33:9 42:19,23 45:15,23 46:22 51:23 57:12 69:6 90:18 93:5 123:1 138:4 268:19
recently 32:10 43:19
recognizes 277:22
recollection 149:2
recommend 264:6
recommendat... 39:3,4
recommendat... 38:24 39:6
recommends 289:15
record 9:25 21:4,6,7,10 27:8 41:22,24 54:22 58:1,4 61:7 70:8,9 73:6 83:10,12 83:20 98:17,20 109:22,23 115:23,25 117:9,11 137:23 138:2 154:2,4 157:16 157:19 168:6 169:21,24 176:19 184:8 184:11 219:8 219:10,11 241:2 244:8 248:4 262:7,10 269:5 275:4,7 287:18,22
record's 286:10
recorded 156:3 291:13
records 58:7 132:8,11,12,16
recruitment 164:4
redacted 58:19
redactions 58:13,14
redistribute 58:8
redo 56:17 61:23 64:21
reduce 151:2
reduced 173:13
reducing 38:18 162:13
reduction 40:24
refer 48:8 257:21
reference 10:17 44:20,22 78:20 80:6 100:22 118:9,10 151:24 185:23 219:22 256:15 259:14 276:15 284:9 286:19
referenced 119:12 275:20 279:15 283:14
references 10:12,25 43:24 47:6 50:18 79:6 79:8,24 81:17 113:20 161:3 195:11 216:24 244:13 245:14
referencing 80:3 272:23
referring 34:20 46:5 63:10 70:18 74:5,12 166:20 198:22 203:4 225:9 259:15 277:5
refers 259:16 259:17
reflect 14:2,13 14:16 272:1
reflected 12:15 19:15 255:18
reflection 255:12
reflects 14:9 15:5,17
refocus 124:1
refute 57:3 113:6 274:6
refuted 81:21
regard 17:12 275:15 280:16 282:4 283:21
regarded 138:19,20,23
regarding 118:8 266:14 266:23 277:8
regards 224:16 225:4,6
registered 291:3
regulation 6:21 276:1,5 289:2
regulator 268:11
regulatory 206:1,7 275:15 279:16
rehash 64:10
relate 30:18
related 12:22 15:13,18 22:4,6 22:11 23:14 25:1 29:15,19 29:22 30:22 31:21 32:14 35:4,5,12 36:12

36:15 76:17,19 85:11 108:16 119:19 152:12 246:7 264:10 278:3
relates 40:7 204:2 283:16
relationship 12:23 45:3 56:1 62:9 95:14 131:23 174:25 186:12 214:17 215:14 231:7 288:3,4
relative 97:21 98:6 106:9 111:9 291:17
relevance 17:7 98:1,3 100:20 112:23 158:24 214:9
relevancy 17:7 17:7
relevant 17:8 18:5 44:5 45:17 45:17 46:3 52:4 60:8,24 62:12 62:20 79:21,25 82:1 84:3,9 85:9 89:25 90:1 98:16 107:23 112:21 119:13 120:9,14,18 126:4,4 142:16 143:9 159:1,2 165:20 167:21 177:21 179:1 181:5,22 182:17,21 183:18 186:8,9 193:8 223:1 225:17 236:9 242:22 243:5 247:3 250:24 251:23 252:25 260:5 267:22
reliability 102:11 103:10 104:10 105:6 105:15 106:2,4 129:12 233:7 234:24 270:8
reliable 27:20 62:20
reliance 102:13 102:19 247:23 271:20,24 272:1,11,12,13
relied 64:20,25 217:14 271:12 272:1
rely 52:18 90:23 115:4 227:23 240:8
relying 68:9,21 277:6
remained 226:16 282:7
remains 152:23
remember 12:9 29:2 31:7,22,23 32:2,21 41:25 69:24 70:23 78:4 150:12 178:10 204:17 275:18 282:8
remind 127:4
removing 279:22
repeat 142:1
replacement 257:2
replicate 240:4
report 4:14 5:18 8:10 10:22 10:22,23 12:15 12:16 27:1,10 27:10 28:2,8,15 31:2 32:9 34:5 34:11,17,21,22 35:1 46:3,4,7 60:5,10,13,15 61:5,11,13,19 61:25,25 62:7 64:15,16 65:5,6 65:14 66:4,15 66:19,20 68:6,6 68:23 69:12,14 72:8,9,21 74:1 74:18 75:3 76:14 77:2,15 77:17,25 78:20 79:11,18,25 80:4,5 81:6 82:8 83:14 85:17,22 87:5 91:18,25 92:3 99:18 102:15 110:15 112:22 115:12,15 116:2 117:18 121:5,10,17 123:3 126:24 127:10 133:14 138:4 147:14 152:15 154:6,7 154:13,14,21 155:8 156:22 157:8 159:14 160:3 161:5,6,7 167:19 168:9 168:15,16,17 169:12,14 176:15,18,20 176:21,23,24 178:7,13 184:1 184:7,18 186:25 187:18 190:18,20 191:16 193:7 194:14 195:11 201:9 202:8 203:7 205:20 206:24 207:7 207:11,14 208:5 213:17 214:21 215:1,6 215:15,16 216:16 217:7 218:17 219:21 219:25 221:22 222:2,3,25 223:16 227:21 227:22 231:4,4

232:14 233:23 235:22 254:14 254:14 256:5 257:25 258:7 259:16,19 260:6,13,13,14 261:8,10 262:16 263:2,3 263:11 265:4,4 269:22 271:20 272:2 277:5 278:7,12,13,14 279:7,14 280:19,20
reported 76:24 81:19 99:15 102:11 103:11 106:6,8,18,23 106:24 108:3 109:3 111:8 117:24 121:15 124:4,11,15 125:6 126:1 132:8 147:11 147:17 154:24 156:14,19 157:21 168:22 169:4,5 177:7 191:21 193:4 215:3 216:9 220:2 221:18 221:19,24,25 224:3 236:11 242:12 246:25 247:4 254:15 260:17,21
reporter 1:24 8:21 130:1 291:4
reporter's 291:1
reporting 99:19 106:13,14 107:24,25 108:24,25 110:6 125:5 244:20 245:3
reports 11:13 12:21 26:25 27:15,16,19 28:1,4 61:17 72:18 160:10 222:15,16 233:1 238:1 263:19,24 264:12,25
represent 161:17 261:1
represented 119:3
representing 270:6
represents 146:6 252:11 268:21
reproductive 89:12 90:5,15 94:7 147:4 148:16 163:7 168:23 170:9 170:10 174:19 175:22,23 218:5,7,9 247:9 265:20 286:2
reputable 36:21 48:3,4 86:25
reputation 87:7
reputed 208:12
requested 9:23 10:8
requests 9:14
require 114:11 261:14,16,19
required 77:16 131:21
requires 274:13
requiring 245:10
research 19:14 21:25 25:19,21 26:5,12 28:25 29:22 42:23 270:5
researched 245:12
researcher 158:25
researchers 87:18 208:11 229:11
residents 20:11
respect 169:2
respectively 216:13
responded 167:10
response 60:22 61:1 63:1 66:21 67:5,14,14,16 67:21,24 82:19 161:20 162:25 171:16 195:4,8 195:9,19,23 214:16,21 215:14,21 216:2,5,15,17 217:14 262:23 263:8 282:14 283:17 286:3,5
responses 161:25
responsive 79:17 114:1
restate 61:19 100:6 111:17 119:16
restricted 166:4 217:21 218:4
result 163:17 163:18 170:24 189:17 280:2 287:22
resulting 277:2
results 27:19,20 52:16 105:13 110:11 127:17 134:22 140:3 143:20,23 148:5 164:22 164:23 171:23 177:13 178:6

182:3 189:20 190:10 210:19 211:7,15,15,18 212:9 216:14 216:15 226:5 251:14 258:3
retainer 13:10
retrograde 76:6 168:2 173:16 227:1 227:24 229:8
retrospective 105:1
retrospectively 111:14
return 86:9 230:16 272:16 292:22
returned 7:9
reversed 106:11 108:23
review 11:13 20:6 24:9,20,21 30:1 31:16 37:23 38:21 42:19 46:14 48:14 49:10 59:11 62:15 70:3 78:10 82:4 83:25 84:4,11 84:21,22,23,25 84:25 85:1,23 97:16 102:14 102:17 103:22 115:7 199:24 205:22 206:4 206:20 220:1 223:20,23 224:2,11 225:17 231:5 234:16 235:18 260:17 275:5 281:15,16,22 287:15 290:10 290:14
reviewed 10:22 11:12,16,22 12:2 21:16,19 25:15,16 26:24 27:2 28:25 37:20 59:5 62:18 72:6,8,9 72:10,13 97:17 102:2,7,17 103:15 115:5 116:25 134:25 135:5 232:15 246:18 272:4 272:10 285:14
reviewers 24:13
reviewing 115:15 267:9
reviews 27:16 81:15,16,24 220:2 223:23
right 15:7 22:2 22:16 34:9 42:15 43:5 44:16 49:23 63:5 64:12 66:3 66:15 67:23 68:1 78:13,15 79:18,20 80:5 80:15 85:9,23 99:8 100:8 101:25 104:23 107:14,19 109:17 117:16 117:18,21 118:14 119:6 120:11 126:5 133:3,9,22 143:1 150:11 155:9 158:15 159:24 160:2 164:23 166:5 168:16,24 170:4 175:11 175:11 179:5 180:15 184:1 184:14 185:3 188:12,13,25 190:15 194:19 199:6 208:15 215:19 222:22 224:5,8 227:24 232:1,13 235:9 236:18 239:5 240:25 241:17 241:21,25 242:6,11,16 247:23 248:7 248:24 249:13 249:15,23 251:22 257:17 259:7,21 262:4 265:24 266:16 272:24 275:20 278:11 281:12 282:3 285:13
rigler 68:25 72:7 74:6,15
rigorous 115:7
risk 35:4 37:23 38:9,18 39:6,7 39:17 40:14,20 40:25 41:2,5 44:13 49:11,14 49:16 50:10 85:10 96:14 97:22,22 98:6 98:15 99:1 101:6,15,17 117:13 121:15 123:22 124:5 125:6,12 126:3 128:5,6 149:21 162:12 163:6,9 163:10,11 164:11 171:13 171:19 172:6,7 172:24 173:7 174:14 177:10 177:24 181:18 183:1 193:6 196:19 200:2 201:5,6 204:2 210:3 212:13 212:16 214:18 215:4 216:8,18 218:17 221:19 221:22,25 222:5,10,24

223:9 224:6,18 224:22,24 225:2,6,8,22,23 226:11 231:10 234:7,14 237:25 238:1 242:16 245:8 245:10,16 246:12 250:2 260:19,21,22 261:1 273:21 276:22 277:16 278:17,24 279:1,1,12 281:11 285:7 285:24 289:22 289:25
risks 40:21 125:5 174:2 218:21 276:23
rls 1:8 293:3
role 18:18,20 81:21 94:6
room 11:4
rosner 84:16
row 83:14,16 84:16 85:8 86:11 124:7 220:13
rows 80:9 192:10
rpr 1:24
rr 189:16 190:9 220:14,19 249:8
rule 276:12,20 277:8
ruled 204:25
rules 8:19
ruling 69:15,19 279:5 281:8
running 165:16 237:14
runs 174:16,17
runway 64:3

s

s 285:9
saed's 270:5
safety 23:6,13 23:18 261:11
sake 222:20
salary 17:4,14 18:1
sales 1:8 292:4 293:3
sample 106:6 106:10,17 107:8,11,13,14 107:15,18 108:2,3 111:23 124:17 140:4 150:13 152:7 152:14 157:21 176:11 185:2,5 186:2,5,9,11,15 186:16 260:2,4
samples 70:21 70:25 71:2,3,12 71:14 109:8 183:23
sandler 102:9 285:9,18
sanitary 245:7 285:25
sas9.4. 165:7
satisfied 258:25
saw 132:23 182:22 217:2
saying 49:21,23 87:21,23 100:23 107:21 134:20 150:9,9 171:22 172:5,8 173:3 185:5 189:24 190:11 207:12 233:17 255:4,8 284:22 290:14
says 37:19 43:18 48:17 54:18 73:17 103:4 105:9 166:18 168:19 202:8,20 215:22 216:5 220:12,14,14 226:23 228:2 230:3 241:1 270:17,20 276:12 277:20 289:1
scale 236:21,23 240:8
scenario 62:13 135:13,13,13
schedule 9:11 9:14,17
schildkraut 76:11 194:24 208:15 246:25
scholarship 43:20
school 18:23 19:13,21
science 65:23 141:24 246:23
sciences 18:19 19:1,9
scientific 27:7 57:1 62:14 87:25 114:6,19 114:21 122:9 263:23 264:13 266:13,23 267:6,12,15,16 267:18 268:1,5 268:9 280:4,14
scientist 265:24
scientists 138:22 205:10 208:13 268:6
scope 60:17 62:1
scopus 114:1
score 237:17,20 238:15,18,19 239:7
scribbled 10:13
se 96:5 113:4
sean 6:12 230:23

search 66:5 79:12,17 80:15 85:2 114:1
second 37:14 37:22 38:20 52:15,21 58:2 88:19,21 89:3,4 89:6 92:5 97:21 103:16 104:7 104:17 106:20 108:22 110:25 111:1,2 118:18 121:22 122:21 122:22 123:25 133:25 134:5,6 134:7 138:15 145:10 152:20 155:3 159:16 160:17 161:11 166:3,5,13 168:25 170:5,7 170:18 174:18 175:3 176:2 178:15 180:16 188:9 202:14 207:8 211:6 212:8,12 215:16,20,23 215:24 217:21 217:23,23 218:1 226:14 228:2,3,8 230:2 235:15 236:4 243:25 244:17 244:22 249:23 249:24 250:25 251:2 253:9 257:7 258:5 262:12 265:12 265:14,14 266:15 273:7,8 285:21
section 25:21 25:23 26:3 27:13,18 37:23 38:18,21 39:12 39:16 43:24 44:6 74:20,21 81:7 89:5 92:5 120:13 122:1 127:20,22 131:22 140:3 149:1 151:22 160:7,10 164:22,24 196:3 197:1 200:18,20 214:21 215:5 218:14 224:9 228:24 233:25 234:1 244:11 244:15 256:18 262:12 270:4 270:22,24 277:12
sections 276:16 277:4
see 21:17 22:21 25:20 28:21 37:19 38:18 40:19 43:14,23 43:25 50:18 60:9,15 63:6,8 68:20 80:9 82:17,21 91:23 92:15 102:13 102:21 105:10 118:7,11,19 123:12,14 125:18 130:16 130:20 137:6 137:10 139:3 141:1 143:20 144:6 146:19 149:5 152:4 153:13 154:24 155:3,17 170:7 182:23,25 192:1,6,12,14 192:23 193:2 194:9 196:7,15 200:21 207:19 207:24 209:20 209:23,25 211:6 215:21 217:22 218:14 220:24 221:2 221:17,25 222:16 223:2 224:18 225:4 225:18 234:21 238:22,23 240:23 241:15 243:16 246:6 246:10,10 248:17 251:4 253:8 255:20 256:3 257:16 259:8 262:11 262:11 269:19 270:17,20 273:8,11 276:7 276:10,12 285:1 287:16 288:16 289:1
seeing 166:10 212:7 218:22 284:7
seem 15:7 82:9 271:8
seems 230:8 263:21 271:11
seen 9:8,10 14:8 24:24 42:2 72:15,16,18,21 98:7 117:16 122:8,21 181:19 192:1
segment 278:8
segments 277:11
select 251:2 252:23
selected 242:19 242:21,23 243:4 245:9 250:9,16 251:9 251:10,22 257:12,20
selecting 146:15
selection 234:25 239:4 244:21 245:2

248:24 249:4
selective 211:1
selectively 174:23
self 102:11 103:10 106:6 106:13,14,17 106:23 108:24 108:25 111:8 169:4,5
send 24:19,20 292:11
sense 52:5 102:7 156:15 156:17
sensitivities 134:13
sensitivity 127:23,25 128:19 130:12 130:25 131:18 134:17 135:10 165:5
sent 292:9
sentence 34:24 49:13 50:12 52:14,20 54:7 88:23 91:10 92:5,6 94:1,20 97:21 98:23 104:7,19 105:3 105:9 108:22 110:3 122:22 126:24 130:24 132:6 140:2 153:14 164:10 166:17 170:7 171:5 174:16 175:3 178:14 179:18,20 180:14 196:3 205:2 209:4 214:15 216:5 224:12,12 225:10 228:3,8 231:3 234:17 257:8,23 263:10 265:14 266:11,18 267:2 273:9,11 273:13 274:8
sentences 92:13 94:21
separate 47:9 126:8,12 148:6 158:6
separately 78:10,11 137:7
september 14:21
series 74:24 75:11 93:9 227:4 275:18 284:5
serous 99:24 266:4
served 33:17
serving 114:7
set 12:22 150:12 186:10 235:4 252:12 258:15 291:7
sets 145:4
settle 34:11
settled 264:8
seven 217:3
several 23:22 34:21 53:6,7 67:15 69:2 80:12 96:19,25 100:11,14,17 135:6 148:3 194:17,18 197:15 206:23 219:5 224:22 233:12 240:10 240:12,18 248:18 250:10 263:13
severe 286:5,8
sex 273:25
shake 8:20
shapes 136:20
shared 219:11 241:7
sheet 292:9,13 292:18,21
sheets 292:19
short 44:8 126:23 181:4 237:14 271:2
shorthand 291:16
shoulders 136:15
show 37:8 139:25 149:1 208:24 212:24 275:23 281:13 281:23 283:1 283:10
showed 90:22 163:8,19 196:24,24
shower 35:3,3
showing 96:12 217:14
shown 90:14,20 277:21 284:4 287:3 289:14 290:6
shows 145:22 193:13 196:21 212:16
side 139:13
sided 14:8 165:1
siemiatycki 263:17
sign 290:22 292:21
signature 291:23 292:8 292:10
signatures 265:17,23 266:7
signed 292:11 292:12
significance 161:10 179:24 180:19 214:9 277:24 279:4 285:17 286:25

287:2 288:9
significant 125:18 126:18 141:8,22 163:8 165:3,18 171:7 171:12 172:13 177:9,13,24 194:11 198:8 209:25 210:9 212:1,4,16 214:5,19 216:9 216:17 219:2 220:3 223:4 251:24 260:18 262:13 279:25 288:13
significantly 164:11 172:11 185:7 224:17 224:23 225:5 225:14,22 237:24
similar 85:3 106:5 172:18 174:2 183:15 189:17 190:9 211:10 218:21 219:3 223:8 247:14
similarly 39:6 160:25 279:4
simple 246:5
simply 146:4 259:24
sing 292:1
singh 1:17 4:3 4:15,20 5:5,19 8:1 34:18 42:8 52:17 53:19,21 54:7 55:4 57:9 59:1 68:16 129:24 142:22 154:7 237:13 263:17 275:8 275:10,14 281:12 285:13 293:5,23
single 75:3,7 77:5 178:24 179:10
sist 181:5,7
sister 105:5 113:2 132:20 135:9 144:22 145:6,14 146:1 156:16 158:4 164:2 167:24 259:1,1,2 288:10,13
site 98:25
sites 178:14 209:4,8
situation 120:4
six 24:10 186:15,15,18 217:1
sixfold 177:6
sixth 186:16
size 124:17 140:4 150:13 151:5 152:7,14 157:21,23 174:22 175:19 175:24 176:5,9 176:11,12 178:20 185:2,5 186:3,5,9,11,17 245:11 255:10
sizes 176:16,17
skadden 2:19
skadden.com 2:24
skimmed 12:1 208:2
skip 105:12 161:4
slate 2:19
slight 123:21 282:21,23
slightly 124:3 252:1
slow 93:23
slowly 244:25
small 89:10,15 112:7 124:17 154:16 176:16 176:17 224:7 251:5 255:19
smaller 52:23 151:2
smallest 52:15
smith 231:13 231:14 232:25 233:23 263:17
smoking 39:9 40:21 41:2 224:25 225:7 267:24
society 4:21 47:22,25 50:16 50:23 51:5
solely 122:1
solid 226:22
soluble 283:23 284:3
somatic 99:1
somebody 181:18
sonal 1:17 4:3 4:15,20 5:5,18 8:1 34:17 42:7 57:8 154:7 292:1 293:5,23
sonya 1:24 291:3,24
sorry 9:11 11:24 14:5,7 19:19 41:11 54:22 58:17 62:5 72:4 77:24 84:23 85:7,17 86:12 89:1 100:6 104:12 105:17,20,22 110:21 119:9 123:13 124:19 140:22,23 142:1 146:24 154:16 155:6 166:7,9 168:17 174:10 175:1,5 175:8,14 178:1 178:3,4 180:8

180:13,16,17 181:9 184:19 188:5 189:8 194:18 196:2 207:12 209:7 215:12,23 219:24 225:15 229:25 255:6 259:4 273:4 278:23 281:19 286:9
sort 18:2 20:21 24:10,22 43:21 54:15,19 82:16 121:7 126:4 192:18 203:13 223:24 253:17 261:5 266:12 277:12
sound 117:1
sounds 78:15
source 58:7 79:5,8 279:15
sources 16:25 87:17 233:13
south 2:13
spans 175:4 238:9
speaking 283:14
specific 12:17 23:16 62:13 86:8 95:20 97:4 99:18 137:15 152:21,24 157:25 168:5 195:1 198:3 213:7 218:16 248:1 267:20 288:18
specifically 88:3,23 97:3 99:6 126:23 153:22 160:4,7 193:14 208:20 228:2,4,15,18 229:2,18 270:1 280:9 290:17
specificity 100:3,8,18 101:4 128:21 134:13,16
specifics 12:14 16:22 31:15 96:22 98:13 206:2
specified 148:8
speed 269:10 269:11
spell 194:25
spend 83:6,7
spent 14:24
spes 135:10
spoken 30:8
square 198:4
squared 198:18 220:7,13,15 223:4
squares 197:9 198:5
stake 116:12
stand 12:11
standard 75:2 114:5,10 205:22 206:6,7
stands 238:14
start 37:17,17 40:23 72:25 100:15 116:22 130:1 162:21 164:20 175:20 185:12 187:15 191:3 203:12
started 18:19 19:21 22:19 158:3 170:14
starting 20:4 69:4 94:1 127:22 132:6 171:5 234:10 260:8
starts 88:23 106:1 175:11 200:10 279:20
stat 197:15
state 81:6 85:24 135:23 141:24 161:21 203:25 211:7 212:2 267:13,15 274:21 290:5
stated 56:22 117:6 121:6 166:25 211:6 279:7
statement 44:17 90:4 92:1 93:1 98:2 99:3 99:5 110:9 161:15 168:12 171:14 183:2 185:18 189:21 203:24 204:5,6 204:9 211:4 214:6,10,24 226:17,20 258:1,3,3,5 261:21 279:16 282:5,20
statements 30:3 30:5,9 36:24 291:12
states 1:3 31:14 44:16 166:23 166:24 226:23 268:11 275:16 276:18 279:25 282:6 293:1
statistic 198:19 198:21
statistical 118:21 125:20 125:22 153:2 161:10,15 164:21 165:1 177:2 179:23 180:18 184:16 189:15 190:7,8 191:5 197:8,16 198:2,11,12 199:14 220:6 223:6 261:6 288:9

statistically 128:6,9 141:7 141:22 151:19 163:8 165:3,18 171:11 172:11 174:24 177:13 190:23 194:11 209:24 220:3 260:18
status 104:11 111:14
stayed 13:15
stenographic... 291:13
step 93:15 204:4 236:1 254:16
steven 5:22 179:15
stimulus 282:12
stop 39:3 73:4
stopped 20:18
strata 186:7
stratified 212:14
stratum 213:7 213:9 218:16
street 1:20 2:5 2:13,21
strength 55:9 56:23 59:23 62:24 67:19 115:19 152:21 152:24 162:6 211:4
strengths 53:14 73:12 152:1,6,9 152:22
stress 168:4 282:16 283:18
strike 72:25 126:6 128:13 215:6 244:2 271:2
stroke 95:25
strong 162:4,8 162:9,14,17 163:1,2 197:20 205:19
stronger 205:11,16
strongly 213:14
struggling 211:14
stuck 203:13
students 19:25 20:10,10,12,13 20:14
studies 29:14 42:20 43:22 45:3,11,12,12 46:22 47:2,2,3 47:19 50:20 52:16 53:7,12 62:15,15,16,16 64:25 67:15,16 68:7,9,21 75:9 75:18 76:23 80:8 81:9,14,15 81:19 82:4 85:3 88:25,25 89:9,9 89:19 90:18,20 90:21,23,24 94:17 95:9,22 96:19,25 98:8,8 99:15 111:13 115:12 116:2 131:8,9 134:1,8 134:11 135:16 138:24 144:18 145:2 148:3 152:11 153:1 158:4 159:14 159:20 160:5,7 160:11,15,17 164:10,13 169:3 173:16 173:23 177:5,9 179:22 183:12 183:21,22 184:24,24 185:1,2,6,14,20 186:19,25 187:2,9,12 188:11,24 189:4,11,16,18 189:19 190:1 193:4 194:17 194:18,20,22 195:2,9,17,18 195:20 196:5 196:16,19 197:14,24,25 198:19,22,23 199:1,6 200:8 200:11 201:3 204:12 206:23 208:12,12,16 208:24 211:24 216:16,20,22 216:23 217:1,3 217:13 220:7 220:14,15,16 221:12,23 222:9,9,13 223:9,11,14,19 224:1 227:2 228:4,15,18,21 229:6,14 230:10 231:6 233:14,19 234:13,25 237:2,21 238:14 239:20 240:1,7,13,14 240:18 244:1 245:9,21,25 246:3,14,17,24 247:1,11,12,14 247:17,19 248:9 252:21 253:18 255:5 256:2 257:9,12 260:16,20,22 262:17 263:7,9 268:3,7 271:7 280:20 281:7,8 284:18 288:10
study 5:22 20:5 20:6,6 28:6,9 28:19 44:4 52:23 53:4,9 64:24 69:10,15

75:10,18 76:12
81:13,22 85:22
87:19 90:17
91:11,23,24
105:1,5 113:2
114:21 115:15
117:20 118:1
126:16 127:17
130:25 132:9
132:14,20,23
133:12,21
135:9 136:25
140:4,11,13
143:13,24
144:2,22,24
145:6,14
146:16,18
151:19 152:1,6
152:9 154:24
154:25 155:13
157:7,21,24
158:1,10,12
159:5 160:16
160:20 164:2,8
164:17 165:11
174:12 178:6
178:20,23,24
179:10,15,25
180:1,19,20
185:10,11
187:1,4,6,17
191:4,6,21,22
195:1,15,15
196:20,24
197:4,11
198:15,24
200:11 208:14
208:19,19
209:4,8,16
211:8 217:5
218:8,11
219:12 220:9
221:2,6,9
223:19,22
226:13 229:2,3
229:5,20 230:2
231:11,12
234:18 235:3
236:5,6 237:16
241:4 244:21
245:11 247:4
247:22 248:10
253:16,19
254:8 256:7
257:13,17,21
257:24 258:8
258:17 259:18
263:11 284:21
286:18 287:25
288:6,10,14
stuff 43:11
subgroup
108:20 110:4
165:5,24
166:25 167:13
168:8 172:2
174:18
subgroups
171:9,18,25
172:17 174:13
subject 118:25
120:18 237:4,7
237:11 287:14
subjective
56:12,13,19,25
236:24
submission
261:18,20
submissions
261:15
submit 34:10
submits 24:12
submitted
14:10,10 21:12
21:13,15,17
22:3,9 29:25
34:5 35:1 278:7
submitting
21:22,24
139:24
subsample
146:15
subsection
278:16
subsequent
68:25 69:11,12
69:12,14 87:19
141:11 161:20
subsequently
272:4
subset 149:4
163:4 257:12
257:20,21,23
258:5,7,17,24
259:17
subsets 253:6
substance 6:23
29:25 276:2,6
276:20
substances
289:20
substantially
155:19,20
201:24
substantive
37:18
substantively
82:11
subtype 35:17
36:9 192:25
193:23
subtypes 100:2
100:12,15,17
193:9 265:22
sufficient 65:7
65:12 66:8
143:7 152:11
177:22,25
206:18
suggest 67:9
89:9 95:23
107:1,6 192:20
217:4 234:13
suggested
76:10 91:12
195:18 205:10
241:16
suggesting
53:10 67:4,24
174:18 281:10
suggestion
282:24
suggests 76:11
107:5 131:19

193:25
suite 2:5
sum 266:12
summary 86:19 216:19 251:16 276:15 276:16 277:15
supplement 34:25 52:11 75:9 138:8 206:3
supplemental 4:14 8:9 12:16 34:17,22 77:1 112:22 121:10 127:10 140:19 178:13 219:21 219:24 230:21 241:12
supplementary 6:14 230:25 240:25 241:8
supplements 138:11
supply 292:12
support 44:10 50:13 57:2 118:22 130:17 264:12,13 284:19
supported 81:20
supporting 279:15
supports 192:15 286:15
sure 9:23 12:19 19:18 21:15 23:18 26:9 28:13 37:15,25 41:19 44:21 49:12 57:16 58:9 59:8 60:12 64:1 69:9 70:5 70:16 74:19 78:12 80:16 82:15 84:2,2 85:1 86:4,6 88:17 91:25 93:13,23 95:12 100:7,13 104:5 107:5 109:19 114:17 117:25 119:7,17 124:2 130:9 132:25 133:23 138:12 140:17 141:18 145:20 147:5 154:12,19 155:15 158:23 159:5 160:18 165:10 172:4 178:21 180:24 186:15 189:1,9 191:17 198:20 210:22 213:16 221:3 233:20 238:16 248:19 253:4 254:17 256:14 283:1 285:3
surface 271:12
surgery 170:15 171:4
survive 111:22
surviving 112:3 112:4
survivor 111:24
survivors 111:10,21,25
susceptibility 98:25 286:4
susceptible 53:23 54:1 182:25 237:1
suspect 129:22 129:23
sworn 8:2
symptoms 95:18
syncing 287:22
systematic 46:14 62:14 81:15 82:3 84:4 84:11,21,22,25 85:1,23 199:23 220:2 231:5 281:16
systematically 108:9
systems 18:19 18:25 19:14

t

tab 41:9,9,11 47:21 52:7 57:6
table 6:14 123:2 137:4 140:15,19,25 144:5,6 147:1,3 149:3 153:23 154:16,18 155:14 156:2 191:22,24 194:4,5,16,18 196:1 197:8 198:19 201:3 201:19 209:17 220:10,12,22 220:25,25 221:1,4,13,14 221:17 230:21 230:25 236:14 236:15,16,18 238:9,10,11,14 240:15,20 241:8,12 243:10,11,12 248:14 253:3 254:20 259:16
tables 138:8 194:6 240:25
taher 6:5 45:19 191:10,12,15 191:22 195:16 200:21 204:20 217:2 221:6 222:14 223:15 238:4,5 239:1 239:11 240:3 240:16,17 262:16 273:2

tails 136:11
take 8:25 9:3,4 9:6 29:4 38:20 41:17,20 43:19 53:24 68:18 70:3 83:9 98:9 109:22 115:22 153:11 154:1 159:15 161:16 219:6,7 224:13 227:7 253:5 261:6 271:16
taken 21:5 41:23 54:10 58:3 83:11 88:24 89:6,8 98:19 115:24 117:10 138:1 154:3 157:18 169:23 184:10 219:9 248:6 262:9 275:6 283:16 287:17 291:6,16
takes 73:22 95:14 271:10
talc 15:13,18 22:4,11,24 23:15 25:1 29:8 30:5,18,22 35:24 36:3,7,15 39:11 41:1 43:24 44:6,11 45:3 46:9 50:14 55:21 68:5,7 69:1,7 72:2 73:22 74:25 76:7,8,18,21,22 76:22,25 81:21 83:25 85:10 86:18 91:12 92:7,11 94:9,14 99:10,20 100:1 102:10 103:9 106:4,13,14,18 108:16,25 109:1,3,11 110:6 111:9 113:1,3,11,21 114:12 117:13 118:2 119:6,13 119:19 120:8 123:16,21 124:4,11 129:3 132:8 133:11 134:9 141:13 146:21 152:12 168:3,13 178:8 185:15 189:14 193:14 196:17 196:18,18 202:5 203:1,17 203:21,23 204:1,10 205:12 208:20 220:2,12,16 221:2,6,9,12 224:5,7 225:1,7 226:16,25 227:1 228:5,19 228:22,25,25 229:3,6,7,8,14 229:20 230:3 248:18 251:15 256:18 257:3,7 257:15 267:20 267:21,23 268:12,12,21 273:11 275:17 277:9,20,21,22 278:2,3,10 279:9 280:18 280:23 281:2 281:11 282:7 282:12 283:16 283:23 284:2,8 284:19 285:6 285:23,24 286:2,12,16 287:6 288:5,18 289:13,14,16 289:19,19,21 289:25 290:4,5 290:6,16,17,18
talcum 1:6 8:10 12:23 24:2 35:2 38:5,5,9 39:3 39:24 40:5 68:2 94:19 96:9 97:9 170:21 171:1 173:24 190:6 192:16 208:24 209:13 231:8 234:8,20 245:5 260:19 270:6 270:21 273:19 273:21 280:17 281:1 285:19 290:9 292:3 293:2
talk 18:17 26:10 36:19 70:17 88:2 94:17 98:8 126:23 127:21 131:12 136:2 147:24 152:17 153:25 154:2 156:18 160:6 160:11,25 165:21 179:12 179:13 180:3 180:22 182:23 184:6 187:1 191:14,15,20 197:12 203:19 207:6,13 269:6
talked 15:16 57:11 64:3 77:15,17,22 99:9 100:10 118:16 126:14 138:17,21 150:20 156:21 158:19 163:18 190:18 193:20 195:7 233:3 238:5 252:24 259:10 270:7 270:11
talking 40:20 41:25 42:12 95:13,14 99:7,8 101:21 104:22

110:8 111:20 116:11 124:18 130:1,5 147:23 158:16 159:19 160:15,16 161:9 170:4 181:12 183:19 186:6 204:22 204:24,24 210:18 215:21 227:19 229:3 248:8,8 255:17 259:14 280:14 287:6
talks 27:10 55:2 93:7 100:8 132:24 140:7 215:1 258:4 277:16 287:4
tanha 6:9 219:15,18 220:1,9,17 223:18 224:4 281:13,21,24 283:14,15
tasigna 32:6,14 32:17 57:10 58:9
taught 20:24
teach 19:21
teaching 19:20 20:5,19,22
team 30:13
telephonic 78:15
tell 33:3,16 73:8 115:14 120:23 123:4 143:22 144:11 173:13 246:22 256:11 277:13
telling 77:11
tem 73:9,16,17 73:18
temporality 59:22 67:20
ten 180:2,21 181:7,8,8,10,23 182:15 183:18 249:25 257:9
term 75:23 93:14,16 95:20 97:2 128:4 144:10,14,17 144:19,20,22 144:24 145:1 145:24,24 146:1 147:6,16 147:21,21 148:14 150:17 183:17 209:10 209:15 233:20
terms 12:14 27:9 65:1 79:12 79:17 81:2 82:2 84:14 87:13 140:4 150:10 157:24 162:8 162:15 186:19 205:1 213:23
terry 193:15,16 193:18,21
terry's 193:5
test 78:25 92:10 172:9 173:12 211:25 212:3,6 212:19,21 213:6,7,10 219:1
tested 70:22 71:12,15,20
testified 8:3 33:18 37:6 54:7
testify 51:13
testifying 72:1
testimony 4:13 28:11 31:1,3,7 31:24 33:10 36:2,7,8 39:25 44:15 49:19 50:7 60:4 61:18 66:1 75:15 92:21 93:20 115:2 118:22 118:24 119:1 119:17 120:17 141:10 150:7 151:15 167:16 191:5 205:14 216:22 227:23 252:7 282:22 291:10 293:6
testing 68:22,22 68:23,24 72:1,7 72:13,14,17,22 73:13,20 78:23 78:24 165:9,10 280:22
tests 125:14,17 164:21 165:1 168:20,21 171:17 173:4 210:8 213:23
text 37:18 78:25 164:19 164:20 166:5,6 166:8
thank 10:3 18:7 24:23 33:4 35:15 38:2,4,23 43:12 61:15 68:1 81:3 83:24 93:25 103:25 109:20 127:1,7 138:16 146:8 152:3 161:8 175:15 176:22 176:25 184:22 215:18 217:24 241:11 257:6 272:25 275:9 290:21
thanks 41:12
theory 210:2
therapies 224:21
therapy 48:24 91:15,20 257:3
thereof 137:21
thing 64:19 78:7 114:11 129:25 133:20

169:14 181:22 183:15 199:19 201:16 206:20 224:15 230:9
things 21:23,25 25:3 39:9,11 40:24 58:19 64:10 87:2,4 106:22 133:19 149:11 187:8 187:10 235:11 266:12 267:13 272:4 287:16
think 11:21 12:13 18:5 22:19 26:4 31:6 31:21 39:12,19 40:6 46:18 48:2 49:2 51:18 54:23 61:16,17 64:3 66:2 67:17 68:19,23 73:4 73:21 78:11 80:20 86:24 87:4 91:6 92:24 96:3,8 97:2 99:7 100:19,23 101:3,19 102:25 103:3 109:8 110:8,10 112:21 113:14 116:9,18 119:21 121:6 121:12 125:20 126:3 131:7,12 131:17 143:12 146:19 147:23 148:21 149:25 152:10 153:22 159:23 161:2 162:6,25 168:10 173:24 177:25 189:23 191:3 193:13 194:13 199:10 202:2,2 210:6 210:10 218:24 222:7 223:5 226:21 227:10 234:14,15 235:21 239:23 246:5 247:24 254:9 259:13 259:14,15,17 261:4,5 263:2,9 267:19,22 269:1 272:14 273:9 274:4,11 274:12,22 280:8 283:8 288:16 289:6,7 289:12
thinking 40:23 93:15 95:24 96:2
third 92:5 238:17 273:9 284:2,2
thirds 168:19 228:14 260:9
thought 105:7 159:7 163:15 202:18 203:3 215:12 288:11
thousand 16:9 33:4
three 11:1 22:9 22:18,19,20 33:19 143:10 144:18,25 145:2 154:15 158:4 167:22 195:25 272:11 283:9
threshold 268:4
thursday 1:18
time 9:4 11:21 13:16 14:10 18:16 19:12 29:2 43:18 48:11 53:6 57:1 62:17 65:13,20 66:7 68:18 83:6 83:7 93:23 109:22 119:10 131:8 136:25 140:10 142:15 142:25 152:8 153:5,17,20 156:19 158:22 158:23 159:14 159:24 160:1 160:11 177:17 177:19,20 179:5,8,11,12 180:4,22,22,25 181:4,5,6,13 182:12,14,17 182:25 183:18 188:11 197:13 198:16 201:10 204:12 210:5 222:21 230:7 233:22 237:14 244:1 245:1 246:19 247:24 256:12 258:15 270:5 271:3 291:7,8,12
times 15:6 34:21 48:8 50:25 139:8 145:13,14 186:15,16,18 208:3 216:10 231:9 233:12 234:20 244:20 245:3,4 248:22 249:2,12,17,20 250:5 258:9
tisi 2:12 14:5 21:2 57:14,21 58:12,16,20,23 59:2 61:22 69:25 70:5,11 70:15 102:25 103:3,5,17,22 103:25 127:4,7 154:13,17 174:10 178:1 217:25
tissues 229:7 265:19

title 103:8 289:1
tobacco 264:2 264:23
today 10:11,21 12:5 26:11 51:17 86:10,13 95:15 112:12 182:2 230:16 280:16
together 61:25 88:24 89:6,8 183:16 185:1 252:22 253:11 253:22
told 38:12 50:22 51:4 210:19
tomorrow 95:16
tons 138:24
took 254:7
top 21:12,17 59:16,19 70:23 144:6 149:8 177:12 209:18 210:18 276:12 285:22
topic 122:19
topical 23:22 23:25
tort 206:8
total 15:9 148:1 148:4 185:25 189:5,12 190:2 195:3 220:16
totality 202:7 203:3
totally 87:24
touch 59:7
towards 34:19 73:18 123:3 184:17 200:13 257:1
town 13:19
toxic 6:23 276:2 276:6,20 289:20
track 17:2 24:7 43:3 269:10,10
tract 85:11 94:7 170:9,10 182:22 218:9 265:20 286:2
tracts 89:13,23 90:6,15,22 125:3 137:8 147:4 148:16 163:7 168:23 170:25 174:19 175:22,23 218:5,7,18,21 218:22 246:16 247:9
tracy 3:5
trading 17:1
traditional 25:16 27:2 42:10
traditionally 141:7,21
trajectories 265:18
transcribed 291:14
transcript 4:19 5:4 42:7 57:8 291:16 292:15 292:18,23
transformation 270:22 271:4 271:17
transformatio... 271:10
translates 97:22
translocation 228:12
transparent 63:22 66:10 67:8 81:1
travel 13:14 286:1
traveled 13:12 13:20
treatment 230:5 270:18
tremolite 75:1
trend 106:11 108:22 195:17
trends 216:2,6 216:10
trial 274:18
trials 20:7 201:17 202:24 203:15,15
triangular 135:25 136:1,2 136:9,10
tried 31:9 244:6
trigger 227:3 282:13
triple 157:4
trouble 199:11
true 99:5 155:24 160:22 201:23 235:10 259:4,5 261:23 291:15,21 293:6
truly 128:19,24 130:11
try 9:4 25:18,22 45:21 61:20 97:6 109:16 133:24 253:16 273:9
trying 17:17 31:12 58:25 60:17 67:7 83:2 84:15,18 142:2 150:11 158:9 165:12 188:17 190:7,8,24 202:13 203:10 204:15 206:3 210:21 211:1 236:3 239:18 244:5 254:9 267:14 269:13
tsca 6:24 276:2 276:7

tubal 90:25 123:4,14 124:8 124:15 125:2,8 125:12 126:2 137:12,19 157:10,13,14 158:2,11 163:19 164:5 164:12,13 170:12,20 245:14 246:7
tube 265:21
tubes 126:9 141:15 163:5 166:21 167:3 167:13,24 169:6,7 241:9 241:17 242:6 242:11,15 243:16 244:10 259:11 282:13 286:19 287:11
tumor 192:1 265:15
tumors 265:18
turn 23:3 25:7 37:13,16,22 43:5 48:11 49:9 52:11 59:9 62:6 74:18 80:1 98:21 105:13 121:21 133:24 140:15 144:5 164:16 165:25 209:3,17 214:15 227:20 230:18 253:3 256:13,18 260:6 262:2 265:8 266:9 276:14 278:11 279:13
turning 25:13 220:22 221:11 244:7
twice 243:22 245:23 249:3 250:21,21 257:15 258:12 258:20
two 11:1,3,12 12:20 14:7 23:5 23:25 24:4,22 45:2 48:14 54:23 74:25 79:7,20 80:11 83:21 92:13 94:20 105:6,10 133:1 134:2,6 145:2 156:14 163:24 165:1 168:19 169:12 169:14,15 171:24 189:24 195:18,25 210:7 211:5,11 211:24,24 212:2 213:8,21 214:8 217:4 220:1,14,15 221:17,18 222:17 223:3 225:19 228:14 231:9 234:20 242:23 243:6 245:4 251:20 253:5,10,22 257:4 258:9,22 259:1,3 260:9 261:9 262:13
type 27:7 28:16 165:4 190:15
types 35:6,22 101:22 198:23 265:16 266:1
typical 247:16 263:22
typo 163:12 189:7

u

ucsf 264:4
uh 104:24 118:20 123:9
ultimately 260:2
umbrella 81:15 220:1 223:22 225:17 281:15 281:22
unable 151:8
unadjusted 135:15,18,23 158:16
unclear 47:18 226:16 282:7
under 6:22 32:10 48:15 57:18 80:10,11 80:12,18 105:20 113:12 118:7 151:19 160:17 205:23 214:8 276:2,6 276:20 278:24 289:19 291:9 291:20 292:21 293:6
undergo 170:12 170:20
undergoing 115:6
undergone 123:14
underlying 82:20 97:18 153:20 169:3 253:25 254:4 254:12 255:12
underpowered 213:24,25
underreported 107:2
understand 8:8 24:11 28:12 41:6 51:3 57:19 57:25 59:2 60:17 72:11 73:23 77:13 88:14 119:17 119:22,25 129:8 140:8,9 142:2,3 198:21 204:15 206:6

208:18 210:21 220:18 233:19 244:3,6 252:9 255:3 256:1 257:19 266:7 269:4
understanding 58:6 109:5 128:4 173:15 201:25 250:23 252:10
understood 13:6,6 30:16 38:17 44:19 45:14,21 51:20 51:22 55:11 59:6 61:21 62:6 63:10 64:6,9,9 71:1,8 72:3,6 72:12 75:22 78:18 80:1 86:9 120:1 122:22 140:1 141:7,21 183:13 213:11 213:11 234:9 267:14
underwear 245:7 285:25
undue 52:22
unexposed 128:21 189:14 190:3,3
unfortunately 43:13 88:11 132:7,7
united 1:3 31:14 268:11 275:16 279:25 293:1
university 17:4 17:14 19:5
unmarked 272:19
unpack 106:15 190:8 204:18 252:2
unreasonable 129:10 276:21 278:17,24 279:1
unsophisticated 174:24
unsurprisingly 256:17
update 61:18 65:14 203:6 268:19 288:13
updated 37:3 37:20 42:17,19 42:23 43:15,19 45:6 46:6 66:6 77:16 160:23
updating 223:20
upward 178:18
upwards 180:1 180:21
usc 122:1
use 6:22 35:2 36:15 38:5,5,9 39:24 40:5,19 41:1 48:23 54:20 62:7 63:4 63:6,13,15 85:10 89:11,15 89:22 91:12 94:19,25 95:15 96:9 97:9,24 102:10,11 103:10,10 104:8 105:6 106:5,6,13,14 106:18,23 109:1,4 110:7 110:16,16 111:9 117:13 129:19 132:3,8 135:25 136:8 138:11 144:7,9 144:10,14,17 144:19,20,22 144:23,24 145:1,17,18,24 145:25 146:1,1 146:21 147:6 148:6,14 149:8 164:4 167:5 170:13 171:12 183:17 194:1 199:21 201:8 203:5 205:1 208:20,24 209:9,10,10,14 211:8 212:9,12 214:18 215:3 216:8,11,13,18 217:17 220:3 221:2,6,9 224:25 226:16 234:14,21 235:25 248:18 260:19 268:12 268:21 273:11 274:1 276:1,6 276:24 277:22 278:25 279:24 282:7 285:6,23 286:17 288:5 289:3 292:19
used 63:16,16 63:18,23 64:14 64:16 66:25 67:25 79:13 91:3,15 92:10 94:14 123:15 131:19 132:13 162:8 170:21 174:19 209:13 241:23 242:5 242:15 257:15 257:21 258:24
user 241:24
users 110:4 146:10 147:14 147:16,21,22 163:9,9,11,12 163:16 210:3 241:20,20 242:8,10 243:14,17,20 243:21
uses 205:23 289:15

using 38:24 39:3 41:4 56:10 58:7 64:5 95:21 97:2 105:5 124:11 131:17 134:12,17,20 136:13 167:12 168:7,11,11 170:14 199:25 199:25 210:4 223:11 236:21 238:14 240:8 242:13,14 273:19
usually 20:5,16 27:10,14,15,25 54:11 198:6 199:22 200:6
uterine 35:10 282:13 288:17
uterus 229:4

v

v 2:12
vagina 229:4 282:12 286:1
vague 149:1
validate 132:8
value 115:20 141:21 165:2 213:6,7,9,20 214:2,5 245:10 245:16 246:10 247:18 261:20
values 136:4 161:11 213:21 261:15,20,21
variable 132:1
variants 157:12
various 99:16 100:2 163:10 183:6 250:13 277:17
vegetables 149:20 162:14
verbal 8:19
verbatim 14:4 23:4 25:18 39:8 61:10 105:8 134:12 136:10 172:15 179:3 179:25 189:13 212:18 265:16
version 88:10 160:23 227:11 227:16 282:22
versus 28:14 31:14 33:7 111:14 124:18 124:19,23 136:9 158:17 163:14,16 183:17 258:12
vi 143:22 144:19
viagra 4:23 51:11 52:9
videoconfere... 1:16
view 233:6 270:8
viewpoint 100:18
viewpoints 54:17,20,25 55:3,12,18 56:21 62:22 63:24 67:22 100:7
vimercati 74:22 74:24
vioxx 264:23
visit 40:12,16
vitae 4:12 18:9
vitonis 118:21
vitonis's 121:4
vitro 62:15
voice 21:3
volume 1:1 292:1

w

w 2:20 5:12 28:3 127:2 292:11 293:25
wait 228:11 262:20,20
want 8:24 9:3 18:16 25:2 27:6 28:12 31:22 55:12 59:2 64:10 68:20 69:25 71:6 73:19 82:16 83:6,7 86:6 91:25 103:17 112:10 120:20 120:24 121:2 126:16,23 133:3 148:12 149:10 165:14 181:17,19 182:19 190:11 199:24 203:17 205:21 206:17 215:15 225:15 225:16 227:20 228:1 230:9,18 237:10 254:8 268:25 271:18 276:14 287:21
wanted 86:3 154:18 230:15 230:17 252:16 288:15
wants 8:25
washington 2:6
way 19:11 56:21,22 62:24 87:11 101:3 113:5 115:3,10 115:14 126:18 130:21 145:24 151:9 167:14 168:9,19 196:2 199:20 208:4 217:11 228:14 238:18 260:9
ways 136:13 172:1 230:10
we've 53:5 64:10 77:17 98:7 158:19

181:19 194:13 208:3 252:24 268:7 270:7 283:10 286:20
weaknesses 73:13
weather 13:15
web 43:13
website 39:19
website's 37:4
wedded 176:16
week 139:10 145:15 146:22 231:9 234:20 243:22 245:3,4 245:23 249:3 250:22 257:16 258:10,12,20
weekly 144:21 258:11,12 259:22
weeks 69:20
weigh 56:21 72:25 73:12 101:3 115:11
weighed 67:12 67:17
weighing 266:25
weight 26:6 39:5 40:23 50:12,19 53:12 62:8,10,11 63:17,18 65:3 66:21 67:4 135:17 136:15 143:18 251:24 255:12,25 256:1,8 262:23
weighting 67:13 255:23
weights 136:11 256:4,5,6
weinberg 285:8
went 10:24 25:6 51:17 90:8 120:3 150:24 219:11 221:15 236:1 240:2 246:17 251:12 251:25
wentzensen 5:7 86:16,18 87:8 88:9 89:14 91:18 98:21 101:23 102:9 138:18
wera 5:24 187:22
wernicke 28:2
westlaw 52:12
whatever's 76:20,23
whi 143:21 144:19,24 156:1 158:4 159:3 167:23 177:20
white 208:25 209:11,23 211:9,14 212:15 216:8
whitmore 194:24
whittemore 238:13,17,22 239:21
wide 143:17 192:9 193:3 255:17
wider 136:12 146:15 255:24
widespread 97:24
wilks 33:7
withdraw 83:4 83:7
witness 4:3 41:17,21 57:17 57:23 58:11 59:4,8 68:13,17 69:19,23 70:6 83:19 88:12 103:2,7,15,20 105:24 106:3 137:2 159:22 166:13,16 175:8,12,14 188:5 192:6 196:8,11,14 219:5,13 232:24 269:13 275:9 291:8,10 292:1,15 293:19
witnesses 115:1
wolf 263:18
women 89:12 89:22 90:5,15 90:25 91:14,14 91:20,20 94:23 95:17 96:8,10 96:16 97:9 107:1,9,12,16 107:22 111:21 112:8,17 123:8 123:13,14 124:7,14 125:1 125:2,12,13 126:1,9,9 137:11,13 140:5,25 144:11 147:4 147:21 148:15 156:4 163:4,7 163:19 164:3 166:20 167:3 168:22 169:5 169:11 170:12 170:20,24 174:19 175:21 175:22 178:19 178:22 180:1,4 180:21 182:19 182:20 183:4 184:14 208:25 208:25 209:13 209:19,23 210:18 211:9 212:15,17 216:8,9 218:4,5 218:6,20,21 219:2 234:7

241:8,16,17,24
242:6,10,13,14
243:15,20
244:9 246:16
247:9 252:12
257:15 259:6
259:10,11
273:19
women's
154:23 155:13
155:23 169:2
woolen 6:13
44:25 45:23
230:18,19,20
230:23 231:2,4
231:12 235:6
238:21 239:1,7
240:17 241:23
242:15,18
244:8 248:8,10
248:24 249:5
250:15,19
251:4 254:25
257:17 258:24
259:16 260:2
260:11
woolen's 45:15
45:16
worcester 1:21
word 77:4,5
129:8 168:4
286:7,9
wording 66:24
words 101:5
130:2 164:21
187:4 269:15
work 14:2,13
14:17,20 15:7
15:10,13,17,24
16:17 17:1 19:4
19:7 35:20 63:3
63:4,5,11 87:15
205:5 206:5
233:6 264:12
265:5
worked 138:21
working 21:21
29:21 284:10
works 87:14
203:10
world 25:18
27:6 197:15
worried 226:2
worse 93:11
284:8
worth 15:6
write 202:7
285:22
writing 70:16
writings 12:21
written 199:17
wrong 58:10
103:5 152:3
166:7,7 196:10
196:11
wrongly 88:10
wrote 77:4
91:22
wu 6:16 98:12
194:24 239:6
247:19 248:10
248:12 251:13
251:13,14,24
252:18 253:3,3
253:24 254:3
254:17 255:16

x

x 4:1 5:1 6:1 7:1
55:22 73:1
80:18 99:21
251:20
xs 80:10

y

y 55:22 99:21
251:5
yeah 11:23,24
14:9,19 16:2
18:21 19:6 20:8
20:20 22:1 24:3
24:3 25:17 27:4
27:15 28:3,18
29:2 30:13 32:8
32:11,14 34:13
37:8 41:21
42:14,18 43:3
43:21 44:1,24
45:16 46:12,25
49:7 50:2 51:2
52:4 53:14,20
54:21 55:17
56:16,18 59:24
60:5,19 63:14
64:10 68:21
70:6 71:4,6,10
71:10 72:10,15
73:20,25 74:13
74:17,23 76:14
77:20,20 78:1
79:19 80:20
82:8,12,20 83:2
83:19 84:7 86:2
90:3 92:14
93:21 94:14
95:8 97:20,21
99:11 100:9
101:13 102:1
102:17,17
103:7 104:21
106:3,23,25
107:17 110:1
110:10 111:5,7
112:5,15,23
113:9,16,19
114:3,3 116:8
117:6 118:3
119:10 122:4
124:16 127:14
127:20 129:2
129:13 130:22
132:19 134:23
135:4 136:20
138:22 139:10
140:10 142:1
144:8,13 145:4
146:14 147:2
147:14,18
149:1 150:2,21
152:17 153:15
153:24 154:22
155:11 156:10
157:1,6 160:4
162:6 163:16
163:16,24

166:2,16,16,22
168:18 169:11
177:14 180:7
181:2,12 182:7
182:7,16
183:24 185:22
188:1,22
191:19 193:4
193:17 194:12
196:23 199:3
199:17 200:20
201:21 202:25
204:7,11,17
205:9 206:2
207:21,23
208:2,22 212:8
213:4 214:13
214:22 216:1
217:8 218:15
219:22,23
220:25 221:7
221:10,14
222:6,6 224:6
225:12,12,16
227:18 228:17
228:17 229:16
235:17,24
236:15,20
238:10,12,24
239:10 240:22
242:4,19
243:13,18
244:18 245:15
247:11 250:17
252:16 253:7
254:2,13
255:11 259:12
260:13,15
263:19 265:11
266:21 268:19
271:6,15,21,23
272:8,14 274:9
277:11 279:7
280:19 281:4
282:21 283:13
286:11 287:2
288:6 289:4
year 14:21
16:17,19,20
17:23 20:9,10
20:11 24:9 48:7
48:19 102:21
110:15 111:18
143:24 156:14
158:23 183:18
years 20:4 31:4
33:18 48:20
51:16 95:14
140:8,9,12
142:15,17
143:10 144:21
144:25 145:3
146:2 153:19
155:5,16
158:24 159:1,2
160:12,13,19
177:23 180:2
180:21 181:7,8
181:8,11,23
182:15 194:9
216:12,12
248:21,22
249:2,12,16,19
249:25 250:5
253:6
yesterday
10:25 13:14
younger 164:3
164:3

z

zachary 2:20
8:6 292:11
293:25
zachary.martin
2:24
zack 9:21 43:7
64:1 139:22
166:9 180:8
184:19
zoom 3:3,4,5

Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY. THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

Veritext Legal Solutions is committed to maintaining the confidentiality of client and witness information, in accordance with the regulations promulgated under the Health Insurance Portability and Accountability Act (HIPAA), as amended with respect to protected health information and the Gramm-Leach-Bliley Act, as amended, with respect to Personally Identifiable Information (PII). Physical transcripts and exhibits are managed under strict facility and personnel access controls. Electronic files of documents are stored in encrypted form and are transmitted in an encrypted

fashion to authenticated parties who are permitted to access the material. Our data is hosted in a Tier 4 SSAE 16 certified facility.

Veritext Legal Solutions complies with all federal and State regulations with respect to the provision of court reporting services, and maintains its neutrality and independence regardless of relationship or the financial outcome of any litigation. Veritext requires adherence to the foregoing professional and ethical standards from all of its subcontractors in their independent contractor agreements.

Inquiries about Veritext Legal Solutions' confidentiality and security policies and practices should be directed to Veritext's Client Services Associates indicated on the cover of this document or at www.veritext.com.